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ABSTRACT

Recology is the combination of teaching and learning through the interaction of conservation (waste management and recycling) and ecology. This fieldbook is designed to provide an overview of the development of a Recology environmental education program. The program facilitates infusion of material conservation education into existing curriculum. Section I is an introduction to the fieldbook. Section II discusses the processes used to develop the classroom components of the fieldbook (presented in section VI). Section III explains five basic operational elements which have been identified and characterized by the Recology program, including external participation, internal participation, technical assistance, planning, and facilitators. Section IV provides guidelines for implementation of the suggested program (addressing materials, techniques, and methods, and basic components and how they work together). Concluding remarks are offered in section V. Section VI is an appendix containing two elementary school Recology curriculums, and two middle school Recology curriculums. Each curriculum contains five cross-curricular lesson plans with objectives, focus, activities, evaluation, and extension components. (LZ)

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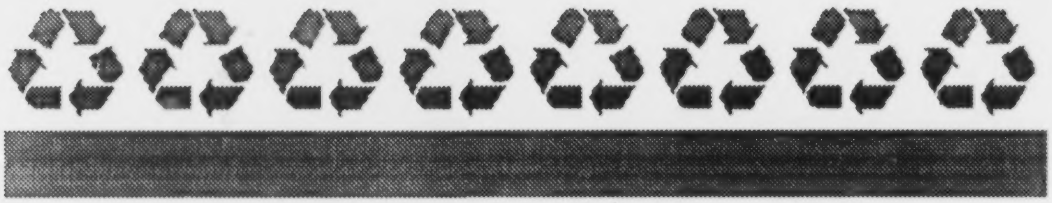

RECOLOGY

Material Conservation Program Fieldbook

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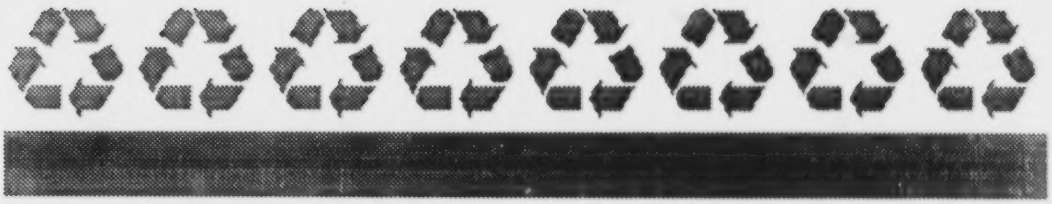

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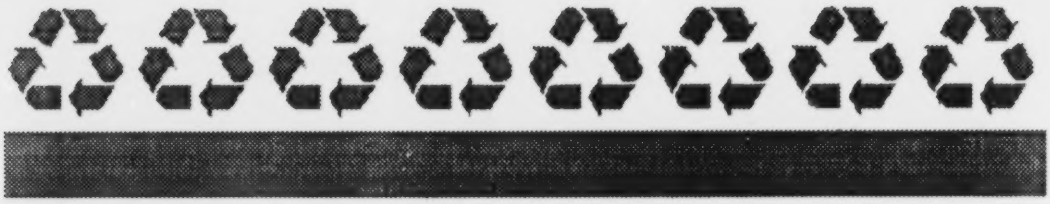


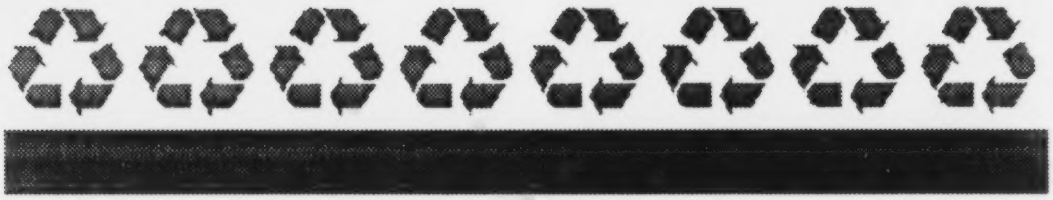
I. Introduction

Recology is the combination of teaching and learning through the interaction of conservation (waste management and recycling) and ecology. Recycling is an issue that impacts more than one discipline, crossing many boundaries within the school curriculum, and within real life.

This fieldbook is directed toward providing an overview for using solid waste management and conservation programs in schools. The intent is to answer questions about how to adapt any material conservation information to the classroom. The fieldbook may stand alone but it will be most valuable to provide a context within which to use other conservation materials. We also want to introduce an overview of how to evaluate material by becoming familiar with some core approaches to the subject. An extensive and somewhat technical framework is built here. Teachers need an informed perspective and a specialist's reference points in order to recognize the bias of environmentalism, capitalism, republicanism, and other idealisms. Subtle prejudice is hidden in many study materials and the teacher's knowledge and values are inevitably communicated to the students. In *Environmental Education as an Integrative Study*[1], Ed Clark states that "Unfortunately, one of the great illusions of the so-called information age is that the way to change people's thinking is to give them more information. The truth is that information, per se, seldom changes thinking. Indeed, the process is just the opposite. The way we think determines what information we take in and how we interpret and use that information." We continue to learn that saving the world is actually a complex task, and something of a balancing act. Creating successful interrelationships during the learning process to allow understanding of conservation is both the most exciting challenge imaginable and the most likely to frustrate and overwhelm.

The process which produced this package is in many ways more critical than Recology itself. There is a great deal of attention devoted in the first section to the derivation of the package—where it came from and why. This is in part to establish credibility, but more to emphasize the evolution and logical context of the program. It has grown in a natural habitat of conservationists, citizens, educators, and students.

Recology is designed to be a dynamic and evolving tool. It was conceived in part to assist in the much more global goal of institutionalization of conservation curriculum in the classroom. It is the product of professional educators and waste managers. The text may err on the side of generalization to preserve its flexibility. The intent is to allow "localization"—the ability to take some of the multitude of good bits of information and help the teacher personalize and bring them home.



II. Building the Framework

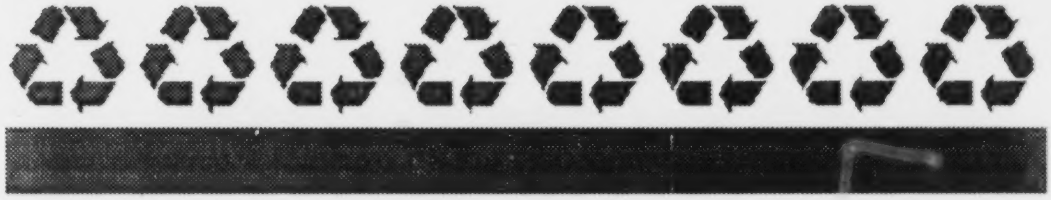
This section will discuss the process which we used (in the psychological sense- the dynamics), which provides the underpinning of the classroom components of the fieldbook. We undertook this task to design and build a structure that combined a collection of elements that hadn't been connected before. This is the blueprint, the instruction from the architect and design engineers to detail the substructure and support. To carry the construction metaphor one step further, it establishes the specifications of materials, the dimensions, and the layout which will be used to build the structure.

▶ 1. Determining the Context

In a sense the most critical element of this fieldbook is the articulation of the ideals and principles upon which the program is founded. It is the fundamental assumptions which lead to the final impression. The morals and values implied in the assumptions provide the basics which lead inevitably to a relatively narrow field of conclusions, and a set of behaviors. This fieldbook draws connections between learning about all subjects and learning about the environment. There is a common group of responsible ideals which students can internalize as a result of learning about environment. Some basic conceptual theories are summarized here.

Context is used here to describe an umbrella of principles. It was defined in an education workshop called Critical Skills, presented by Northeast Resource Recovery and Antioch New England Graduate School. Wendy Mobilia says in *Critical Skills Activity Design Supplement*[2] "Context is a framework that determines meaning. Too often, the context of classroom learning experiences is limited in scope and disconnected from the larger contexts that would make learning relevant to the learner. We need new contexts... that encourage students to care because they can see and feel the connections between what they are learning and the world around them. We need contexts that bring the pieces together into a meaningful big picture . . . " Ed Clark, in the *Holistic Education Review*[3], discusses what general systems theory refers to as the isomorphic nature of all ecological systems- both natural and cultural. "This means that, regardless of their many differences, all natural and cultural systems share certain fundamental organizational characteristics. ... the same principles which apply to the planetary ecological system can be applied equally to all academic disciplines and fields of professional study. By incorporating these principles into its fundamental structure, environmental education will become the vehicle by which the integrative, relational principles of ecological systems can be applied to all of our cultural systems . . . ."

Another expert source who elaborates on these ideas is John Colletta, a professor of education, and for him context is a synonym for environment. Both Colletta and Clark subscribe to a theory that our mental framework is directly related to our physical habitat. Nature exists as a



context for what we think and are. This is a very global abstraction which links to secular humanism and complex philosophical arguments. In order to stay on the simpler side of these abstractions, we want to keep using environmental terminology.

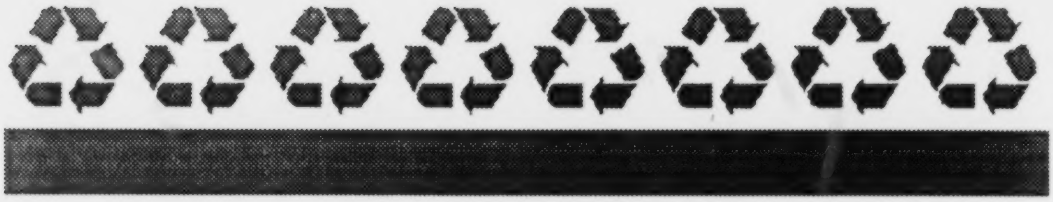
Ecological categories of *Carrying Capacity*, *Interdependence*, *Diversity*, *Change/adaptation*, *Competition/ cooperation*, *Cycles*, and *Energy flow* are seven distinctive functions into which Ed Clark divides general systems[4]. His point is that these functions are ecological and cultural descriptors of *context*, the environmental and cultural framework in which we all live. Overcrowding, and every ecological principle, effects the inhabitants of an office, a home, a planet, or a vernal pool in exactly the same way.

Context is important to the Recology project because it provides a shorthand referent to the larger principle of ecology encompassing everything we think and are. The concept of context is a metaphysical inclusion in an otherwise logical and simplistic text. Context also is intended as a reminder of the concept of environmental education as an encompassing discipline, in which all other disciplines may be studied. Environmental education provides a context. In this fieldbook environmental education is directly linked to waste management, and even more specifically- recycling, which becomes the referent to the larger context.

Integrating the Reduce, Reuse, Recycle Philosophy

There are many approaches to the waste problem. Industry has been especially sympathetic to the proliferation theory. The basis of this argument is that we're being inundated with constantly and inevitably increasing waste. This proliferation phenomenon is especially carefully advanced by the combustion industries (businesses which burn trash, sometimes generating power as a byproduct)[5]. This approach is also relatively enthusiastically approved by the packaging industry and other producers who would maintain the status quo or increase production (and consumption) through simple supply side economics. Faults with this argument include the evidence that the amount of cost effective diversion of materials from the waste stream is possibly higher than seventy five percent[6]. If the infrastructure were to divert this amount of material, and if source reduction were to impact the initial quantity of material, the amount of waste would decrease. In actual fact the five year projections for the waste stream have been too high, due to numerous factors, including more recycling[7].

- **How the solid waste hierarchy fits**
  The time worn homily—*reduce*, *reuse*, *recycle*, *burn*, *bury*—is still the commonly accepted priority list among conservationists in developing waste management options. Integrated Waste Management, which postulates that all options are feasible also includes the prioritization of alternatives. The most desirable option, where it is implied that most resources should be applied, is *reduce*. One problem is that still, reduction is a soft technology (some would say it



is not a technology at all). It has few service proponents because there is not an *engineered* fix, like an incinerator or landfill, which can capture large scale revenues from doing it. Reduction is like removing non point source pollution in water conservation. It is diverse and dilute. It is often difficult and expensive to detect, and while prevention may be strategically cost effective, in the short term it may look threatening to investors demanding earnings.

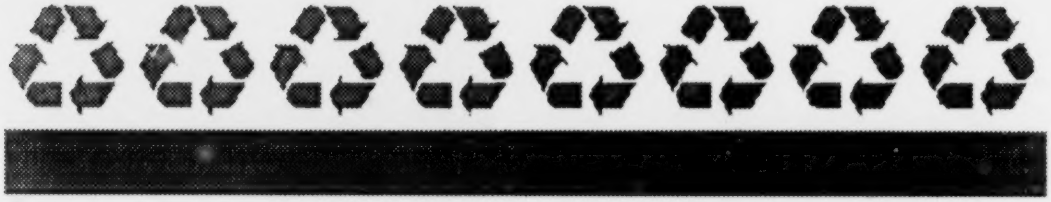
How Do Recycling and Ecology Mix?

Recycling and ecology are linked by common principles as mentioned in the context discussion above. Both can be viewed as naturally circular, like the food chain or the Krebs cycle, taking invested energy and converting it into new products. These new products then contribute to the restoration of the elements at the beginning of the cycle. The balances are continuously readjusted by the process itself. But the process can be maladjusted. Disease is one way of describing the individual organism's condition when the balances go out of whack- the dysfunctional cycle. Wastes are a great indicator of the health of the organism.

In the context of recycling, our environment—our homes and communities—have become increasingly and significantly effected by disposal of our wastes. In every community we see evidence of the effectiveness of handling systems for waste. Certainly one of the reasons that recycling is such a powerful tool for teaching environmental lessons is the fundamentally obvious connections between air and water quality and effective waste disposal. Phrases like "everyone lives downstream", and "we all breathe the same air" connect the images of river waste disposal and backyard trash burning to principles of clean water and air. A symptom of diseased neighborhoods is faulty disposal of wastes. One mark of a sick neighborhood is visible trash. The principles and terminology used in waste management embody the close links between characterizing organisms biologically and a collection of organisms sociologically. Quality of life issues are also closely linked to waste management.

Waste management practices can be seen as a mirror of the health of the overall societal organism. Ecology is a macrocosm description of the interrelationship of all living systems. Recycling is the palpable, graspable microcosm process which illustrates and reflects the larger principles. You can see and touch it in your classroom. There are newly polished tools, curricula and other techniques and materials which reinforce recycling education and elaborate on this context.

- ***Cooperation* and *Partnerships* are core principles**
  One of the most powerful assets of school resources is *partnership* (now popularized as a buzzword). While recognized as a potential for many years, it has only been roughly in the last fifteen years that schools have been universally encouraged to devote significant effort to formalizing relationships with business resources. These relationships offer in-kind as well as



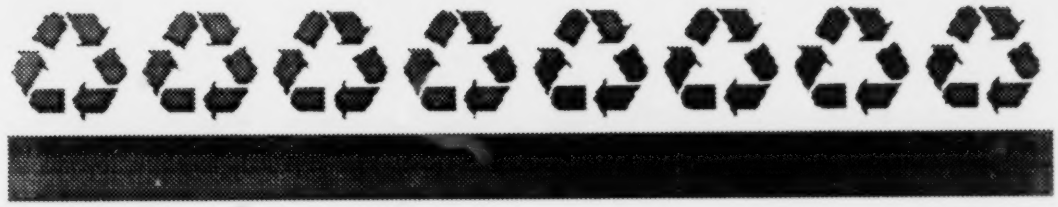
financial support for mutually identified equipment, personnel, and field experience. Government and institutional contributions have also been forthcoming as schools expand their classrooms to allow students to meet professionals for specialized lessons, or go off site for field experience in the real world setting of the workplace.

COMMUNITY AND BUSINESS SUPPORT One strong benefit of local business expertise is the up-to-the-minute information that is available about local conditions and infrastructure. In the case of the specialized field of recycling, the waste management business people and community authorities have the most accurate knowledge about who is doing what to whom, and with what when it comes to the handling of recyclables. Markets for industrial byproducts and processing information are valuable commodities for the new environmental managers who are addressing conservation in business terms. Knowledgeable local managers quickly resolve practical school waste management operational questions. Current and future projections about cost effective handling is available from professionals with hands-on experience. This input precludes some of the uncertainty which has clouded the decisions of conditionally isolated schools. By bringing the experts into the schools, decisions quickly become well informed.

Our educational systems address the needs for skills. Public schools are the primary mechanism for developing the ideal employee. Their product—the future ideal employee—will have sensitivity to conservation in order to keep our economy competitive in a global setting. International businesses are competing for the best product design, economical life cycle, and minimized byproducts within countries who have more stringent standards. It is absolutely essential for the business and community experts to help identify and focus adjustments to the schools' effectiveness in producing workers who have internalized conservation principles.

- **Parallel development of science and math curricula**

Parallel to the involvement of business there has been an initiative to increase achievement in math and science. Initiatives to make science and math curriculum more meaningful and relevant have led to improved skills development devices. Institutions such as discovery museums have produced irresistible interactive exhibits. Programs are available nationally which exemplify the hands-on, problem solving, team building reinforcement for the experiential utilization of analytic behavior. Curricula include GrowLab (National Gardening Assoc.), Fast Plants and Bottle Biology (Univ. of Wisconsin), Family Math and Science (Univ. of Calif. Berkeley), and Project Seed (Northeastern Univ.), to mention just a few[8]. These are innovative, creative, and stimulating instruction kits that engage students in explorative research. Discovery is the process and teachers function as technical assistants or consultants to guide learning, which is individualistic and independent. These techniques and support systems are indispensable natural allies of the Recology program.



EDUCATION NETWORK Massachusetts has developed PALMS, Partnership Advancing Learning in Math and Science. PALMS includes advancement departments in secondary educational institutions like Northeastern University and Boston University, resource departments in community colleges, special training for lead teachers, equipment and resource access as well as actual grants to assist in broad scale implementation of hands-on curriculum. The professional support for using new techniques is reaching the rural, inner city, and budget problem schools—schools which have the greatest need. We have worked with the PALMS initiative to coopt some of their lead teachers into using the environmental context and curricula and Recology as local resources.

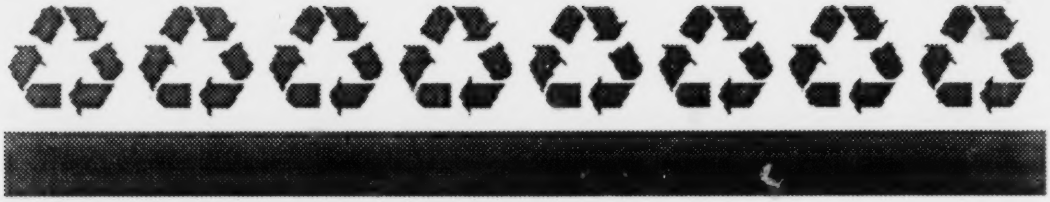
What Is the Importance of Infrastructure?

Having discussed some of the esoteric aspects of environmental education as it relates to recycling, another major part of the recology subject is a practical and concrete level of waste management called *infrastructure*. This is the nuts and bolts of getting rid of stuff in schools. Let's dig into the basics, the nitty gritty.

The professional support system which brings services to schools includes waste removal. There are basic economics which dictate price for these services. Some of the factors which influence cost of handling waste include:

- weight and volume of material.
- frequency of collection (related to storage capacity).
- distance of transport to disposal or processing.
- tip fee (unloading charge).
- secondary material markets.

Favorable contracts for waste disposal may often be negotiated when consolidation (compaction and separation) of material occurs. Compaction occurs in industrial containers with hydraulic attachments. Separation refers to the sorting or initial separate storage of materials (William Rathje, Garbologist, has done extensive research on the mechanics and contents of the waste stream[9]). The most visible, and possibly the most influential element of the infrastructure is the hauler (vendor of collection services or trash man). Collection efficiencies for less than full load quantities can be done with milk route management, meaning that small quantity pickups may be combined. Predictability of the supply means that full loads every two weeks like clockwork allows efficient equipment use. If quantities are maximized and predictable, the greatest cost effectiveness is available to the hauler. Getting competitive bids by giving haulers the most desirable specifications will result in lowest prices.



Other unpredictable but guaranteed variables in the formula are market conditions. A good market price for the material means that there is demand, and haulers will offer better collection terms because there is offsetting value. When demand is poor, value drops and hauling prices increase. The specifications and prices for materials are bound to change. Recovered materials are commodities, and prices are vulnerable to supply, demand, and whim. The hauler who can offer the most stable long term contract factors in the variable value of materials.

▶ 2. Using Scientific Method to Examine the Problem

Elements of scientific method can be used to label the outline of events leading to Recology. Problem solving was instrumental in developing the Recology program.

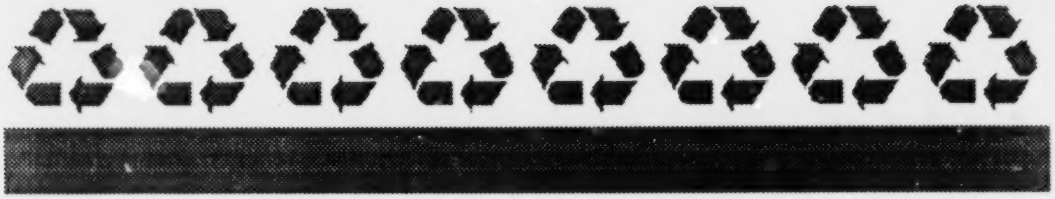
- Observation—people in working groups discussed the recycling education situation.
- Objective analysis from group process produced the outline of a hypothesis.
- Experiments were proposed to test the hypothesis.

Observations and Objective Analysis

Contributors to these observations include the Environmental Hazards Management Institute, (EHMI); the Mass. Department of Environmental Protection, (DEP); MassRecycle, Massachusetts Environmental Education Society, (MEES); and Educators for Social Responsibility, (ESR). Over a period of ten months in 1990 input was collected, articulated, and revised.[10] Two major conclusions were distilled.

- **Schools use recycling to teach conservation principles**
  The prevalence of recycling in schools was evidenced through a number of sources. The proliferation of teacher-associated information requests was noted by local and regional authorities and recycling groups. A survey conducted by EHMI on a national scale concluded that recycling was the most common environmental initiative in the classroom/school.[11] The MEES network was broadly represented, but review was mostly from the professional team writing and reviewing the Massachusetts recycling resource guide.[12] DEP was directly represented by its education coordinator, and reviewed the assumptions and interim products

- **Burnout and unrealistic expectations lead to failure**
  An informal survey of twenty Massachusetts schools which had once had a recycling program showed that thirteen (65%) had dropped recycling after at least one year. The circumstances were identified primarily as loss of enthusiasm or responsible person relocation (lead teacher and/or students). Other circumstances cited included loss of market/vendor/hauler or change of collection practices.



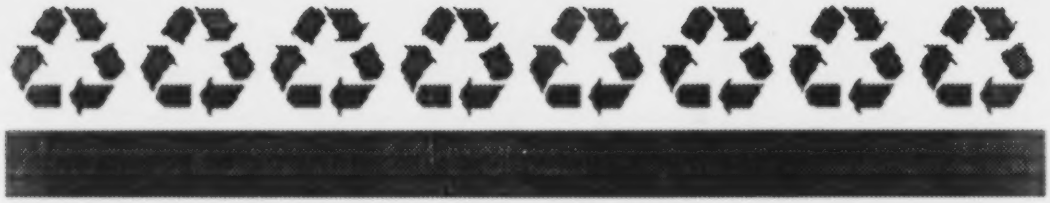
Failure of programs may lead to a negative lesson about the value and accomplishability of conservation even beyond the initial recycling message. This was the motivating factor for conservation educators to determine a better way to deliver recycling programs in schools. It is possible to conclude that conservation is impractical, unrealistic, too difficult, and not worthwhile. The simplistic and generalized assumption is that since recycling didn't work here, environmentalism can't be practical. It is better to demonstrate a successful recovery program than a failure. It is also better to introduce the dynamics of a more complex and realistic long-term project than a poorly considered frustrating dead end.

Forming the Hypothesis

The observations defined above prompted numerous theories and speculations about the circumstances and symptoms enumerated. There were common threads which connected most comments, and the elements were generally agreed to be summarized by the following statements.

- **Flexibility needs to be built into the process of developing a school recycling program.**
  One primary problem is an erroneous assumption that *the conditions at the time of starting a recycling program are stable*. The motivated individuals who start programs are often totally uninformed about the technicalities of recycling. Little technical information other than general publications are accessed. The variable and difficult economics of recycling cited in the discussion of infrastructure above are not taken into account. Recovered materials are defined as commodities, and the nature of commodities is to respond to a fluctuating supply and demand. Schools need to be prepared for the realities of the paper and plastic markets. Durable contracts and arrangements need to be premised on the spectrum of possible conditions. Idealistic efforts to collect everything are economically impractical. On the other hand, teachers are not experts in everything, nor can they be expected to remain fully informed even in interest areas. Here is where partnerships, external support, and student developed resources make an essential contribution.

- **Broaden support base**
  An error is to let a relatively small group of students, or often one individual lead teacher, take all the responsibility for the actions necessary to accomplish the recycling program. The burden is usually unrecognized and unrewarded. In order to improve these conditions allies are needed in the form of fellow students, teachers, administrators, and interested individuals external to the school. Forming a primary resource group is expedient delegation of authority.



▶ 3. Who Cares About Background?

The process which produced Recology took almost three years. The participants besides those mentioned above include several primary resource agencies which were instrumental in finalizing the format for the project. They are nonprofit private conservation organizations. CET, the Center for Ecological Technology, Pittsfield, is an innovative conservation group operating in the essentially rural environment of Western Massachusetts. Earthworm of Somerville has specific experience in the delivery of paper recovery services to institutions, including schools, especially in an urban setting. FACE, Fundamental Action To Conserve Energy, is a North Central Mass. nonprofit energy education service delivery agency. MassRecycle is a statewide coalition and communication network of recycling advocates. These agencies offered early and continued involvement and produced a realistic outline of the purpose and goals.

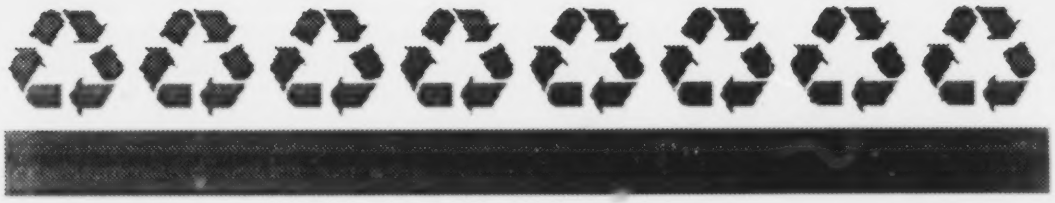
Durability of Early Contributors

In 1989 and 1990, besides the organizational interests and allies working on the program, a number of individual teachers were struggling with the issues in their own schools, and looking for guidance and inspiration wherever it might be found.

- **Students for Environmental Action, SEA, then and now**
  Fred Meshna is a high school teacher attempting to recreate in school the same efficient recycling program he facilitated as a citizen in his community. Fred's students are encouraged to become activists in environmental causes. Fred brought SEA to North Middlesex Regional High School in 1989. One of Fred's SEA student activists created the new name of Recology to describe an environmental group which would focus on combining the lessons of recycling and ecology.

  The students at North Middlesex, where Fred still teaches, have worked on recycling actively since hosting the first Recology conference in 1990. They have produced student leaders who are now entering college programs in environmental science.

- **Steel Can Recycling Institute, Partnership for Plastics Progress, and Keep America Beautiful provide perspective**
  Businesses and recycling trade associations were active participants in the initial discussion, review and revision of the Recology program. Materials describing support services, existing education curricula, and studies on the effectiveness and utilization of their own material were made available to the MassRecycle group. Corroboration of the observations developed in the northeast could be assessed in the light of national experience. Almost no quantification of utilization or effect of campaigns and published material distributed by the associations had been done. The Council for Solid Waste Solutions, representing plastics, had done



the most to track the usage of their materials, using return postcards with comments to evaluate and gauge their packages. They were already thinking about better feedback and more data.

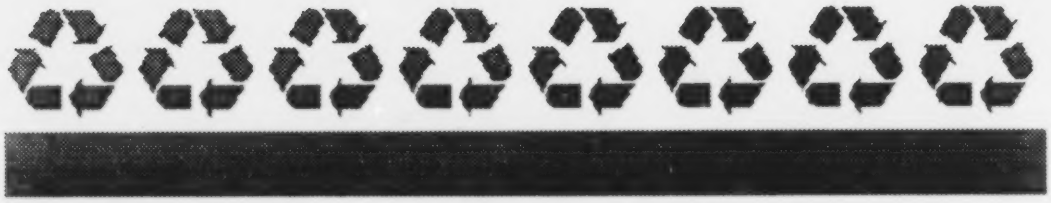
EPA Funds the Six School Study

The Recology program was conceptualized to incorporate the elements necessary to test the hypothesis of stabilizing recycling in schools through developing waste system flexibility, broadening the business and community support base, and facilitating environmental education curricula utilization. To fund the research, the Recology program was structured to meet the criteria of the Environmental Protection Agency's education grant. It won an EPA education grant award for a one year pilot project which began in 1992. FACE elected to become project leader and grant manager. Schools were chosen to be representative of a number of different demographic and institutional variables. One common factor was enthusiasm and interest in participation. In order to standardize the data and test assumptions of grade appropriate material it was decided that grades K-12 would receive as similar a program as possible. One facilitator did the contact work for all the schools, conducted all meetings, and prepared all reports. In order to reduce the variables, the same materials, agenda, and instructions were used for all schools.

- **The full range test group and controls: K-12**
  We decided to include all grades. Speculation about which grades could or couldn't benefit was recorded in initial meetings. Which grades were best able to assimilate values was controversial. Old teacher's tales speculated that kindergarten was too young, and high school too old, with students more or less impractical and/or impossible to involve. In order to lessen the influence of preexisting circumstances the study was comprised of three same grade groups (elementary, middle, and secondary) from six separate schools, and as many classes as possible in each school. Our information would be broad based, but there would be many variables within the grade groups.

  The two elementary schools which participated were different in that only one was connected directly to the school bureaucracy which supported the program. Both were rural and part of a regional school system. One elementary school had a strong internal and external community recycling network, and the other had neither. The middle schools were differentiated by population base, one was a metropolitan neighborhood school, the other a regional group of rural communities. The high schools were both regional and rural, but one was in a different demographic area. One was directly affiliated with one of the elementary schools, so interactive projects and mutual reinforcement were possible.

  Three control schools from the same region made it possible to relate the experience within the pilot schools to groups which had no direct exposure to the program.



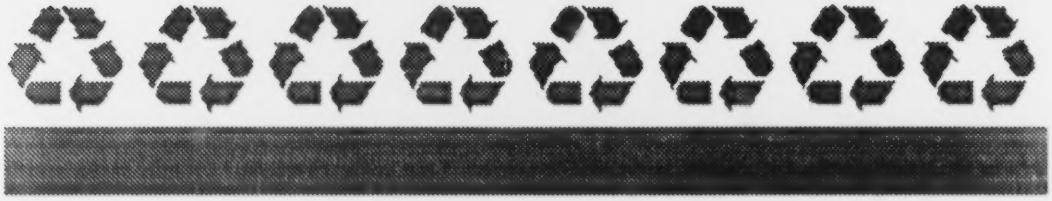
- **Statistical report, 7,000 students**
  General Electric's Elfin group contributed time and expertise to the survey development. Fitchburg State College's Statistics Department was also involved.

  The early determination was to develop a statistical base by which change could be measured. The device became a seventeen question survey which was administered uniformly to all groups as a before and after measure of attitude and value change. There is a well recognized inaccuracy in drawing qualitative conclusions about actual attitude or behavior change, especially with a limited survey device. The conclusions of the survey were reported as quantitative change. The control groups were examined representatively and conclusions were extrapolated. A fifteen page summary analyzes some of the data and uses charts to compare grade and school changes[13]. The final conclusion was that education made a significant difference in every grade.

Evolution, Year Two, the Package and Consequences

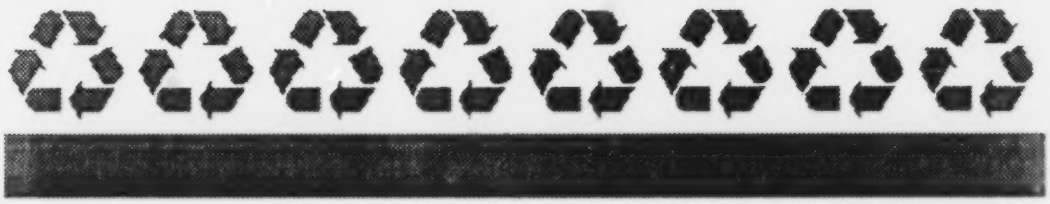
As the result of the field testing of the principles and practical pieces of the Recology program, we made a number of revisions and priority changes—products of the intense first year analysis. This package is the culmination of more than one year of review and comment by participants, observers, contributors, and independent educators. There was much that was extraneous and problematic about the delivery of the original program. The components were often the product of a process which was being invented as it proceeded. Monthly meetings and much of the hands-on facilitation work have subsequently been judged non-essential. Complex waste audit procedures provide a baseline which does not need to be duplicated. In short, this program can be done much more simply and effectively. We sought private funding for a second year of testing on a much reduced basis. It was determined that a fraction of the on site time used in the pilot study was necessary.

- **JP Routhier, Norton, NEBS are local green businesses**
  Corporate sponsors were sought for support of the second year of the program. Local businesses which had an investment in the first year's program were able to support the continued development. In themselves, they are evidence of the value of the partnership principle. Mutations of the original package were demonstrated to three 5-7th grade school classes through interested lead teachers. The first year lead teacher from one middle school prepared and delivered an inservice program to another middle school under a separate grant. The conclusions of all this experience has led to this virtually free standing fieldbook.



- **Johnny Appleseed, City of Newton, Lunenburg, Thorndike, Varnum Brook, green schools**
  The lead teachers who experimented with the second version of the Recology program have been interested activists in their own right. One of the persistent problems of the program is to expand the activist base. It is necessary to develop a support group within each school which will operate more cooperatively in accomplishing the many tasks associated with material recovery. It has so far been a failure to effectively and permanently co-opt a significant segment of the faculty to do hands on support of recovery programs. The lone lead teacher remains a persistent phenomenon which may only be susceptible to top down institutionalization of conservation curriculum.

After all this foundation, we are ready to look at the Recology program as it is currently described. The fieldbook gives it the formality of a finished product, but like all educational tools, Recology will be molded to the hand of the craftsperson by experience. It also describes a volatile and dynamic field in which change is the only certainty. The remaining sections are the operational core of this project, and are intended to stimulate further experimentation.



III. Recology Components

There are five basic operational elements which have been identified and characterized by the Recology program. The first is external participation, earlier referred to as the broadened base of support. Within this component are business, community, and organizational partners. The second is internal participation, including administration, custodian, faculty, parent, and student supporters. The third is technical assistance in the form of curriculum, lesson materials, bibliographic and research material sources. The fourth is a plan which includes at least a two year projection of goals and objectives. The fifth is a facilitation partner, a local resource which will act as an objective mediator, a fund-raiser, a convenor, a cheerleader, a media representative, and a patron/sponsor of the project.

These elements are not necessarily independent, nor exclusive. The sponsor or combination of sponsors in #1 who wants to go the extra mile and do some of the legwork, operational arrangement, and nitty detail (like meeting announcements) can overlap and fulfill the functions of #5. Anyone from any group can input to #3. The people discussed in these categories are all potential members of the Recovery Group, the team which establishes the planning and operational forum. The Recovery Group is the resource support base which keeps the lead teacher from carrying all the responsibility.

▶ #1 Basic Element: External Participation

Business, community, and parental partners

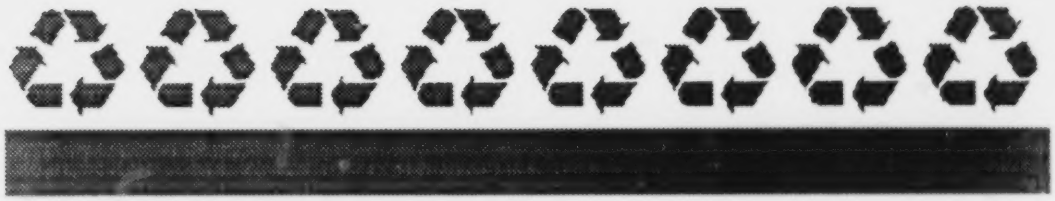
These are the people outside the school familiar with how things work in the recycling world. The business members have expertise in waste management through experience in their company. Business members may be service providers—with service or products that deal directly with waste management— or they may be familiar with waste management systems in a company which practices management of its own waste. Organizations may have a mission interest in conservation, or be willing to expand their associated environmental concerns to include this solid waste project.

Their most valuable contribution is knowledge about what is practical in terms of planning and systems.

▶ #2 Basic Element: Internal Participation

Administration, faculty, custodian, parent, student

Obviously the broader the base of internal support, the greater the likelihood that the project will be successful on an ongoing basis. Remembering that Recology seeks to stabilize recycling



efforts, the goal is to produce a system and process which can withstand the changes and vicissitudes of recycling. People get tired of handling materials, the system breaks down occasionally. Almost inevitably poorly planned systems lead to inconvenience, leading to frustration, leading to burn out, leading to no program. This should be an incentive to attempt guarantees and firm commitments for involvement of the key sectors in the project. Administrative involvement need not be direct, but it must be informed.

Incentives for guarantees/commitment from internal participants include positive impact on the waste budget, providing a cost-avoidance benefit to the financial bottom line. This particular element must be very carefully assessed and portrayed. False expectations of economy or even of profit have led to major dissatisfaction with programs and their advocates. It is of course assumed that conditions change unpredictably.

The team needs to contribute top down involvement if the path of recycling is to be durable.

▶ #3 Basic Element: Technical Assistance

Curricula, classroom and lesson materials

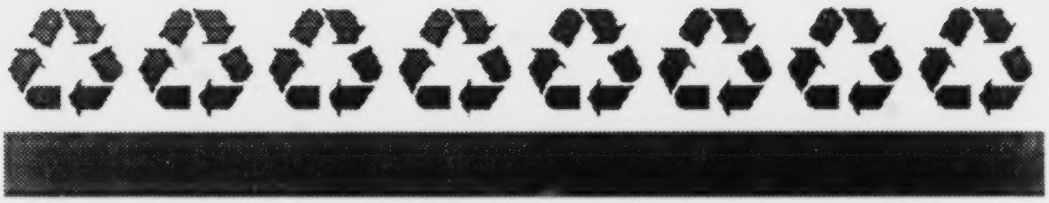
In 1993 there were more than 250 complete waste management curricula available nationally. This is not to mention the thousands of resource aids which are not complete curricula. Nearly every state has a resource guide or curricula- some quite extensive and evolved (Washington State, Vermont). Major trade associations have produced specialized and polished packages (Steel Recycling Institute and American Plastics Council for example). There are wonderful accumulations of material from public and private foundations or organizations (Tennessee Valley Authority). The EPA has produced extensive educational guides and support materials (they also maintain and assist access to reference services).

This element contributes effective teacher/student resources to support classroom activities.

▶ #4 Basic Element: Plan

Two year goals and objectives

The forte of Recology is its length of vision. Problems arise from thinking exclusively in short term objectives. This arises from the activist's propensity to want something done NOW. Waste has been with us since soon after our origins in the forest. Looking beyond the semester, the school year, or even two years, is a challenging task, but it is not dealing with new things, it is recognizing behaviors that we have developed over eons, and designing systems which accommodate people's expectations. Beverage can barrels which have a small round hole to reduce contamination or the clear and visually easy to understand labeling of accepted recyclables on the container provide examples of planning.



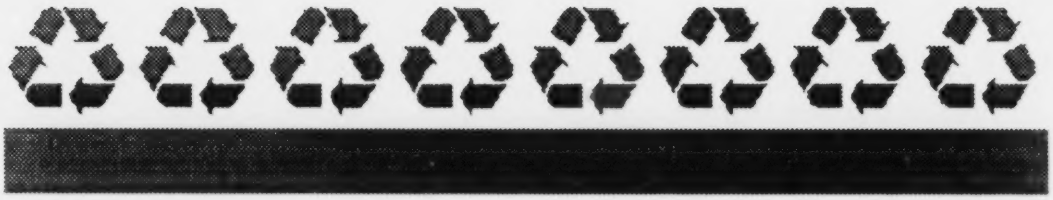
This element provides a sense of permanence to the project, and like any good business plan, convinces investors that the recycling products will be around for a while.

#5 Basic Element: Facilitator

Local external partner

Our experience of advocating for conservation education in classrooms has produced the conclusion that personalized attention and follow-up produces the best utilization of curricula. In order to get classroom time, someone other than the teacher must be allowed to deliver a message, or the teacher must be motivated enough to incorporate it into the standard lesson plan. Recology quantified classroom hours in the pilot schools, and determined that there were significantly higher hours dedicated to conservation education. Our conclusion related this result to a number of factors, including on site presence of the facilitator and external participants, as well as the institutional support resulting from the administrative approval. Grade level and degree of departmentalization were dependent variables which also affected classroom time. But the fact that there were other interested parties- like recycling coordinators and community activists who were also going into the schools with presentations and programs influenced dedicated class time. A local external and invested partner who helps lead teachers focus by organizing, providing materials, demonstrating local initiative, and general encouragement acts as possibly the most important resource. Catharsis, sounding board, venting object, and gopher are only some of the potential services.

This factor is as complex to engender as finding a reliable relationship and contributes the value of a supportive family member if it works.



IV. Doing It

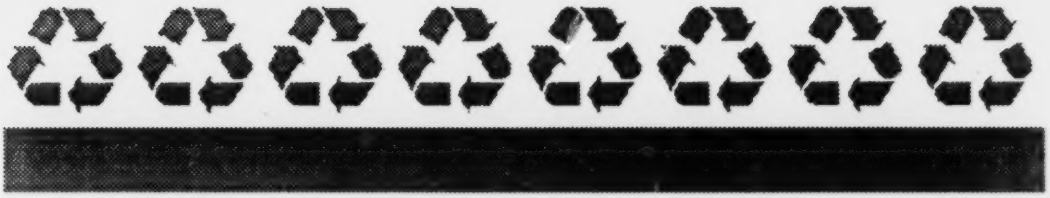
The initial factors, categorized in Components, section III, define the players and role, focusing on organization, participation, and management. Recology can be produced with a very flexible set of materials. The outline provided suggests "localization", incorporating the specifics of local politics and personalities into the context. The lesson plans were developed by the teachers who used them in cooperation with FACE as facilitator. The fact that any teacher can and does develop material into lesson plans is obvious. The fact that they often choose not to do it without internal or external motivation means that someone organizing a lesson plan workshop will expedite the process. We did very successful cooperative brain storming and lesson planning sessions in several schools which actually helped integrate the teachers' approach to the subject and increased their enthusiasm about the program. The average reaction was "we should do this more often."

▶ 1. Materials, Techniques and Methods

The demand from most teachers is to get something right now that can be used in the classroom. New bibliographic resources have recently been developed, and are currently being refined to provide access to the best, newest, and most comprehensive materials. Adapting techniques and methods to materials is another subject which interests teachers. SWEN, the Solid Waste Educators' Network, is a New England resource group sponsored by several core institutions including the Franklin County Solid Waste Management District and the Connecticut Resource Recovery Association Visitor's Center. Online and regional environmental organizations are producing a steady stream of new subject specialized and timely information which is disseminated best through person to person professional networks such as SWEN.

Adapting and Adopting Interdisciplinary Cooperation

"Environmental education is a process of moving individuals toward stewardship and ultimately a union view of the relationship of people with nature. Environmental education is process more than it is content." In an article titled *Promoting Concern for the Environment* (ERIC CSMEE)[14] by Joe Heimlich a number of classic resources are cited to support the infusion of environmental education into the curriculum. Heimlich states that "... there are general precepts which can guide a teacher to fully incorporate a philosophy of environmental stewardship or union into all teaching settings."[15] The hypothesis of problem-solving stated here is certainly such an tool. "[Environmental education] is an integration of disciplines with no exclusion of strategies and synthesis of information ... that can occur more readily than when disciplines are isolated. In this process, cognitive understanding is not sufficient; affective and behavioral development is necessary to affect significant value, belief, behavioral, and cognitive shifts in individuals."[16]



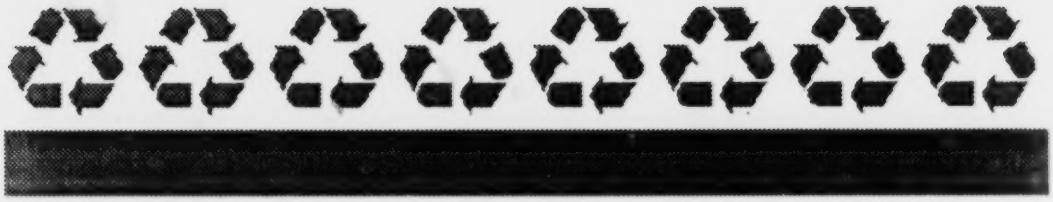
- **Citation of ERIC summary of ed/philos.**
  It took almost no surfing of the America OnLine interface with ERIC, the national environmental database, to discover the above article by Joe Heimlich. It was right on top, where a lot of people had been using it. It has an extensive bibliography of material attached, and is relatively simple to download. It is an example of how much more accessible environmental resources have become to educators and associated professions. In order to adapt and adopt material to the classroom, permission most immediately comes from the teacher who sees that the materials are relevant to cultural standards. One of the places to find the most current cultural value systems represented is certainly the information super-highway.

Problem Solving/Critical Skills Are Motivational Tools.

The activity guide *Critical Skills Activity Design Supplement*[17](also mentioned in Context above) was the result of collaboration between solid waste professionals and teachers. It was produced cooperatively with Antioch by NRRA, (Northeast Resource Recovery Assn), professionals with fifteen years of recycled material handling experience. The supplement discusses teaching waste management concepts within a conservation context.

- **Practical skills include leadership and communication.**
  The nature of environmental activism is disseminating information. To be able to take a directive role in recognizing and defining a problem is an important leadership characteristic. To articulate the problem, formulate it in a way which everyone understands, and get it to the people who need to know requires communication skills and persistence. There are twelve critical skills outlined in Antioch's guide, including decision making, critical and creative thinking, organization, collaboration, management, independent learning, and documentation. While there are many ways to define important skills, these are certainly some which can be responsibly included in any lesson plan. The Antioch method allows the teacher to actively plan and design them into Recology activities.

- **Hands on manipulation of the environment**
  Critical Skills calls its basic unit the LBRP, Learning by real problems, which empowers students to take action on a real issue. Since waste management in the school is a real problem, it will be Recology's determinate issue as we explore lesson themes and localized projects. Learning how recycling effects the local, national, and global environment is the hierarchy of context in which inspiration can be found for classroom examination. There are many possible ways of coming up with an LBRP, one is by referring to the critical skills activity guide, which outlines many by grade level including *Reuse It* activities and litter awareness. Another is by brainstorming with students what they see as local issues.



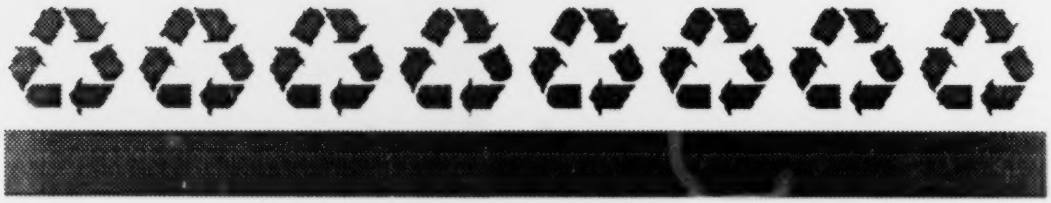
- **Team learning and working together**
  Once the problem is identified, a team learning approach to examining it and developing consensus about working on it is an aspect of the project. Since environmental issues affect everyone, learning to work together is another part of the activity. While students need to internalize personal values, there can be demonstration and recognition of the group's benefit from solving problems. One of the most frustrating aspects of real world problem solving is getting cooperation. Students can practice developing and maintaining a sense of common purpose among diverse interest groups long enough to get something accomplished.

Grade Level and Technical Information

We ran into one strong objection while developing the program. Many participants felt that lesson material is grade sensitive, and that kindergartners would have little to base projects on, so that activities must be very basic. The conclusion of the survey is that kindergarten students are nearly as well informed and as motivated as their high school equivalents.

- **How flexible is existing material?**
  Of the more than two hundred fifty curricula, and probably thousands of specialized lesson plans in the solid waste database, most have been developed or revised in the last fifteen years. In that relatively short time span, evolutionally speaking, much has changed as the nation develops the infrastructure and base for waste management and recycling operations. Many earlier guides have been revised or supplemented to include a more current understanding of major issues, such as what waste materials are the best to collect. An example is the question of whether plastics are recyclable. It is possible to have a much more technical discussion today because we have learned a lot. Styrofoam should be used with the reservation that in most areas it is not considered recyclable. The development of styrofoam recycling systems and the virtual collapse of the infrastructure in most areas due to low virgin material prices is a study in corporate economic manipulation. What and how to collect has changed from the local recycling group led efforts to full scale industrial sized MRF (material recovery facility) plants in both rural and city environments. The competition between burning, burying, and collecting has heated up and taken new forms. *WasteWorld*[18] from IWSA, Integrated Waste Services Association, is a very polished, multimedia curriculum produced by the waste combustion industry. It contains many biased ideas, some very subtle, including minimizing the idea that source reduction is a waste management tool.

  There are many ideas, approaches, and plans available to the teacher and student in new materials such as *Environmental Inquiry*,[19] a privately produced curriculum from the state of Washington. Washington holds an excellent national reputation with its very early government sponsored curriculum. Additions and revisions are currently being made to improve



state programs which provided early and respected standards, such as Vermont, Wisconsin, Massachusetts, and Washington state. Proliferation and independence have caused almost every state to have an approved curriculum of its own at this time.

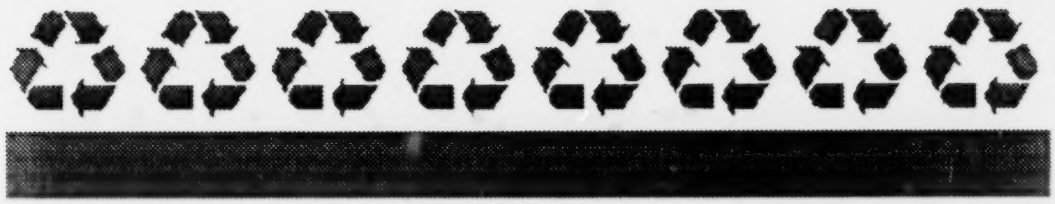
Multiple School and Urban Applications

Trying to maximize the impact of a program such as Recology leads to attempting to get groups of schools under the same governing authority to work together. Schools with common financial management, such as regional systems, have a tie that binds, and municipal systems that draw from the same budget care about each other. By influencing central decisions greater efficiency, durability, and impact can be achieved. But proximity geographically was falsely postulated as a motivating force; it required major incentives to get teachers (administrators were impossible) to interact just because they had common recycling purpose with a school not part of their contract group.

- **Can cooperation among schools occur?**
  Recology actually changed the material handling of several of the pilot schools because a common understanding of larger systems and impacts could be brought to the discussion by informed students. When specifications are being developed, provisions of the contract may be drafted to protect the interests of the conservation of resources ethic. Opportunities exist for students to educate purchasers and school business managers on prices of recycled paper or supplies. Creative ideas can help develop common collection routes and best ways of separating materials (i.e.- removing organics). Schools can combine regular routes to accomplish consolidation of material, transportation can be more effective with compaction, and source separation which produces cleaner materials has value to contractors who market materials. It has been said that if a twenty ton truckload of any clean recycled material is assembled, someone will buy it.[20] These factors have helped groups of schools develop common systems. Pennsylvania is an example of legislated cooperation among schools, and recycling coordinators are required to include schools in their planning . Beyond regulation, cities like Newton, MA have voluntarily increased their school recycling because of municipal coordinator's active facilitation of cooperation.

Integrating Broader Curriculum

There are opportunities to integrate the lessons of energy conservation with waste management. Indeed some would say there is no way to separate them. The standard by which waste management is often judged is cost effectiveness. Costs for the life cycle of a material- cradle to grave measurements of the input needed to produce and dispose of an item- has become a challenge to standardize. As the data becomes more clear about how to quantify life cycle costs of materials the units which are often used are measures of energy. How many BTU's are there in virgin



products at different stages of their life cycle, and what is the expenditure of BTU's in moving materials through processing, distribution, and disposal. Water is heavily involved as a direct and indirect measure of the impact of waste management. Water quality is usually perceived as endangered by waste management facilities, but in a more direct sense it is related to manufacturing of durable and non-durable goods. Production creates many opportunities for waste recovery processes such as the compostable sludge produced by recycled paper plants which, when implemented, significantly impact water conservation.

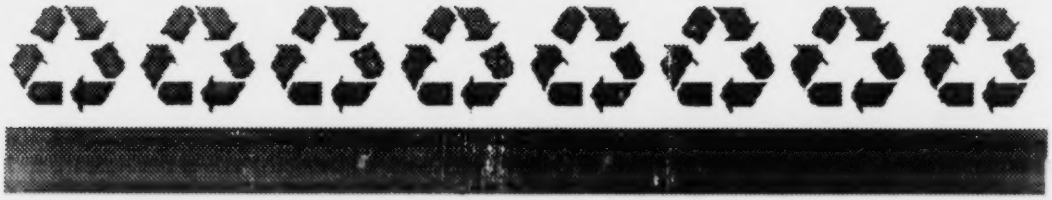
- **Energy, Water, Land, conservation of other resources**
  The mindless capitulation to arguments which pertain to prove that recycling solves all our conservation problems is outrageously naive. Simplistic approaches have overvalued collection without considering total costs and practicality of reprocessing and marketing of recovered material. It doesn't make sense to collect a material which will be thrown away anyway. The sometimes fact based rumors that materials have been collected only to be burned or buried is perhaps the most damaging public criticism of recycling. It is necessary to determine relative priority of power production, water and land usage issues, and other resources such as clean air which are closely connected to waste. Aseptic packaging- the common brick pack juice drink box- has become a recent example of a commodity which is relatively costly to process, and may be impractical to recover with current technology. Balancing quality of life issues for neighborhoods demands including social justice factors which consider general population welfare with waste disposal facility siting, traffic, resource protection, and long term capacity planning. These are very complex issues.

▶ 2. Features: Basic Pieces and How They Fit

The original Recology project contained features which were designed to address needs common to every school. The pieces were designed to be flexible enough to be adapted to varying levels of commitment and ability as well as time. Half of the program was a research project administered by a fully funded research facilitator, so at least fifty percent of the time does not need to be duplicated. The original program used more than 20 support hours per school per month, which included reports and evaluation as well as actual on site time. It is difficult to fund that level of support, even with volunteer and in-kind contributions. The revised program could be conducted with as little as one hour per school per month for the facilitator. At this reduced level, the parameters of the time for features are strictly limited.

Recovery Group Lends Enthusiasm

The most valuable time spent is building external support enthusiasm. It is the best return on investment because the recruited energy is able to sustain programs in meaningful ways in the



absence of the facilitator. The ongoing relationship between NEBS and Ashby Elementary has provided a paper collection and consolidation link which endured two years after original program meetings.

Survey Establishes Baseline and Change

A pre- and post-test process is recommended to evaluate the program. Knowing where you started, how much students understand and value their local recycling systems, is possible without surveying every student. The logistics of the survey now that the data is in place allows comparison with the study group, and a ten percent sample is still statistically sound. The other value of the survey is as a stimulant to the people surveyed. Curiosity and reactive responses increase motivation and provoke participation in the larger group. Since it can be internally scored, and is a great math lesson tool, it may be shared among departments and used in math class.

Audit discovers materials and flow

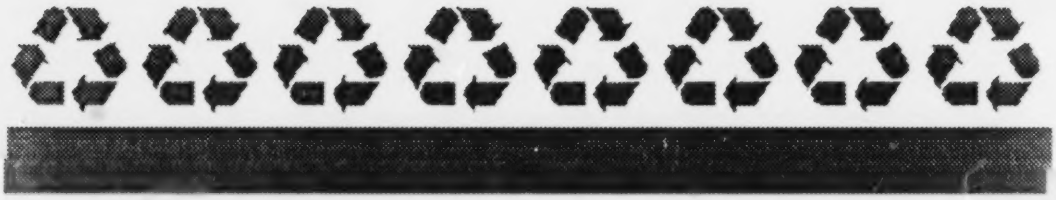
The material audit is an interesting exercise to discover internal flow patterns of material and to help stimulate recycled content in purchasing habits. It is time consuming and imperfect at any level, and very variable in format if done efficiently. It is a useful device to pinpoint problem areas, and can detect safety as well as waste management problems. It is guaranteed to produce surprises when analyzed.

Lesson plans demonstrate localization

The sample lesson plans included in the Recology package are the result of an extensive process of review within each pilot school to determine the best focus for lessons from the perspective of that community. There was a significant diversity in the subject areas, methods, support materials, and core issues considered among the schools. Some focused more on organics and composting because it fit well with planned units, problems, and perceived value. Many cited specific references to favorite resources, methodology and technique. Some schools wanted to get outside, to work more in the field, or more in a certain discipline, like focusing their project on problems which would require use of mathematics methods. Field trips were easily arranged and always productive.

FIGBY, Finding in Garbage, Beauty

The art contest which was open to the whole study school population was popular, and provided a visible product as well as a concrete project which students could be judged on. There was a grand prize among all participating schools which allowed communication and visibility between schools and a real hook for the media. Students also received real rewards for their efforts, and grand prize awards were substantial—$100 in three categories. The prize money was all contributed by private industry, which also gained visibility and participation in community affairs.



Recovery plan: going for the long haul

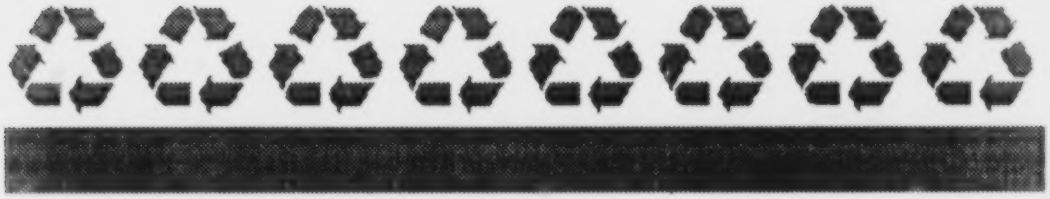
The amount of time spent on strategic planning in order to perpetuate the system and institutionalize the plan is well served. From the beginning the program was billed as a three year project, and it was understood that we would be back to see how things had held together two years after the last facilitated recovery group meeting. Informal contact during the second year shows that all study schools have retained some level of involvement.

V. Conclusion

The original Recology project was a qualified success. The immediate adaptation of such an expensive program has been impossible due to absence of funding. Developing ways to accomplish the objective of stabile recycling programs in schools requires economy. The challenge of adapting what was learned in the first and second phases of the program into a new product has been undertaken here. The fieldbook will be our first attempt to turn things we have learned through the project into a relevant and readable supplement to the original Recology plan.

The resolution of the cost effectiveness problem is proposed in the role of local facilitator. The task is to find someone to be the local conservation education facilitator who can provide support for the program through in kind contributions under existing funding, raise additional funds to support dedicated time to the program, or attach volunteer support which has no out of pocket cost.

Recology is worth doing. It is a way of targeting educational resources toward environmental education. It captures method, material, and time to promote meaningful local structures which are serving individuals, institutions, and the communities they comprise.



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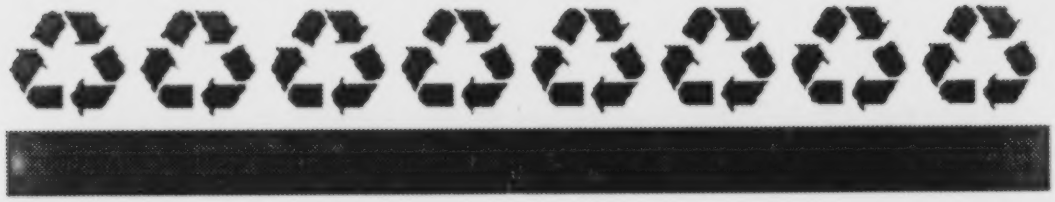
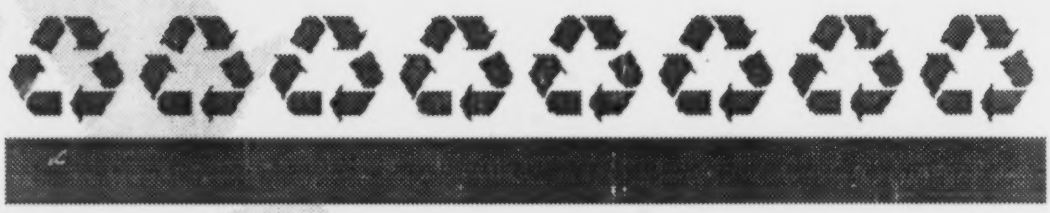


VI. Appendix

Resource Materials

Bibliography

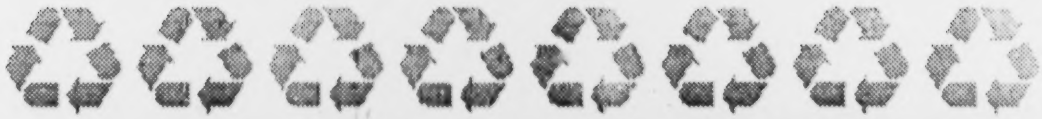


RECOLOGY

a curriculum developed for

Ashby Elementary School

by FACE
Fundamental Action
to Conserve Energy



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- Funding for the Recology project was made possible by a grant from the Environmental Protection Agency.

- The lesson plans contained in this book were created under the auspices of FACE especially for Ashby Elementary School by Lisa Petel assisted by Nancy Malette.

- Clarence Snyder and The Elfun Society were of primary assistance in the development and analysis of the survey.

- MassRecycle, Earthworm, and Center for Ecological Technology (CET) were instrumental in developing the initial concept and proposal. Amanda Graham at CET deserves special credit for her help.

- Credit for typography and page layout goes to Peggy Roberts.

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Reuse, Recycle

Activity Help students distinguish recyclable from non-recyclable materials by allowing them to have hands-on contact with these items. Reinforce skills necessary to distinguish the differences between the items.

Lead-in Ask each student to select a picture from an old magazine of an object that is reusable or recyclable . Each student will explain to the class why his or her object is recyclable. Make a collage of the pictures.

Development

1. Set up a display of recyclable materials such as newspaper; corrugated cardboard; ledger paper; computer paper; steel cans; aluminum cans; glass containers (brown, green, or clear); plastic milk, water, or juice jugs and soda bottles.
2. Demonstrate how to prepare each of the sample materials for recycling.
3. Put students into groups of 3–4, mixed by gender and ability.
4. Give each group a sample of recyclable materials. Have the groups prepare the materials for recycling.
5. Groups then place the items in appropriate, labeled boxes in the classroom.
6. Facilitate a class discussion about what can and can't be recycled. What can be brought to the Ashby landfill for recycling? Why can't certain items be recycled?

Evaluation

Evaluate students' ability to successfully participate in group work, as well as their skill at determining what can and can't be recycled.

Extension

- Have students make a "How to Recycle" book to bring home to their families.
- Older children may play a recycling relay race. Divide class into teams. Each child picks an object from a bag of mixed clean trash and delivers it to the appropriate box. Boxes can be labeled with the type of recyclable and "non-recyclable."

What Happens When the Landfill is Full?

Activity Have students develop a better understanding of what options exist for managing solid waste and the costs and benefits of each option through group work and brainstorming.

Lead-in Ask students to imagine they are living in a town named Marvelous, Massachusetts. Yours is a pleasant town of . . .? People. Unfortunately, your landfill is full. What is Marvelous going to do with all its garbage?

Development

1. Put students into groups of 3–4 mixed by gender and ability.
2. Each group is assigned an option to the landfill such as voluntary recycling, mandatory recycling, mandatory composting, incineration, or transporting garbage to another landfill.
3. Groups must investigate the pros and cons of their landfill operation. Have students answer the following questions:
   a. For how many years into the future are you planning? Why is this an important consideration (population growth, long term economic impacts, etc.)
   b. If creating jobs is high on your list of priorities, which option is best. Does recycling eliminate jobs?
   c. What wastes can be composted? How do you find out about community composting programs? Is composting too time consuming to be an option to the landfill?
   c. What are the pros and cons of incineration? Do the benefits outweigh the costs? What about toxic ash and air pollution?
   e. Where can you obtain more information about options for Marvelous's solid waste management plan?
   f. List suggestions for what you can do to ensure the success of Marvelous's new waste management plan (e.g., community education, providing containers for recycling, etc.).
4. Invite the manager of the Ashby landfill to your class. What options is the town currently investigating?

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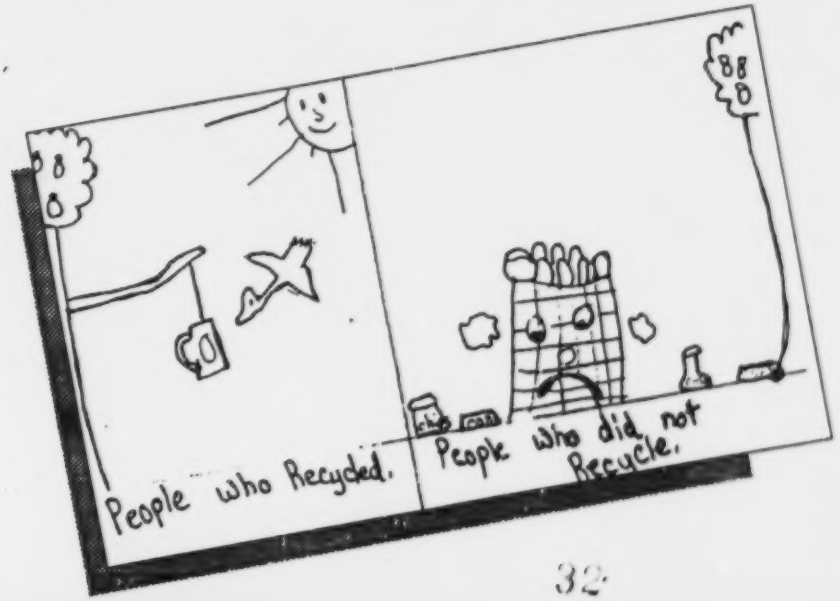


Evaluation

Evaluate students on their ability to work productively in groups as well as their knowledge of landfill options.

Extension

- Create a compost heap in the classroom to demonstrate one option to landfills.
- Americans generate more trash per person and more trash in total than the people of any other country in the world. How do your students feel about this?

Should We Burn Our Trash?

Activity Students will evaluate the advantages and disadvantages of combustion as a waste management method.

Lead-in Take a quick survey of how many students know what method of waste disposal Ashby uses. Have any of the students been to a landfill or seen an incinerator? Is burning a good way to get rid of trash?

Development

1. Ignite a piece of paper. Allow students to watch the process. How much material is visible before and after the paper has burned? Be sure to have a jug of water available to extinguish the flame if necessary.
2. Introduce the process of incineration and its advantages and drawbacks as a waste management tool. Burning can reduce the volume of trash by 80 to 90 percent.
3. Break the class into two groups. One group is for incinerators, the other group is against them. Have a class debate!

Evaluation

Evaluate students on their ability to understand the difference between incinerators and landfills, as well as their knowledge of their community's waste disposal method.

Extension

- Invite the manager of an incinerator to class to describe how the process works, what sort of preparation is needed, what kind of special treatment is required for the ash residue, etc.
- Arrange a trip to the landfill. Have students prepare questions prior to the trip. One option would be to divide the students into small groups with each assigned a different angle such as the physical process involved, water contamination, etc.
- Take a sample of trash and have students sort out items that could be reused or recycled, removing them from the waste stream. Compare the amount left to be burned with the original sample. Discuss the implications of burning vs. recycling.

Adapted from *The Solid Waste Management Resource Guide for Massachusetts Schools*

Looking After Our Septic Systems

Activity Help students learn about how to take care of their septic system through exploration, brainstorming, and problem solving activities.

Lead-in When you pour waste into your drain where does it go? Let students brainstorm as many answers as they can. Record them on the chalkboard.

Development

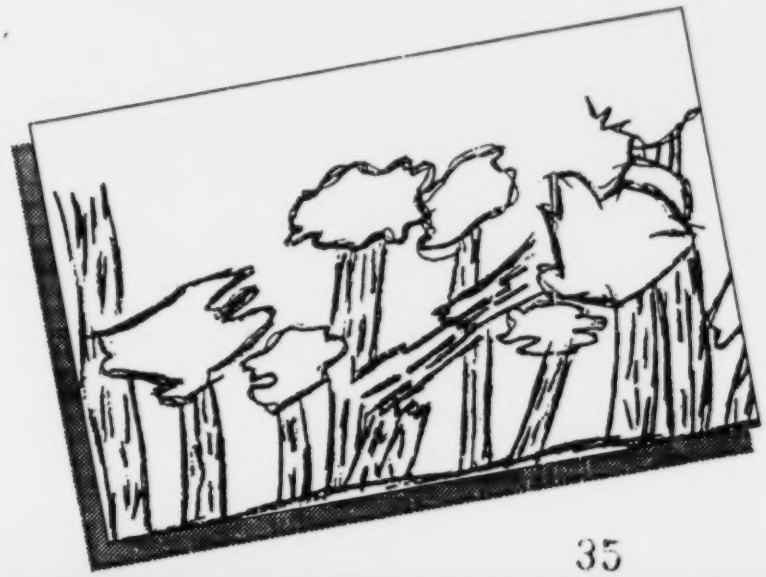
1. Introduce the process that waste undergoes when it's put into a septic system. What are the advantages and drawbacks of the system?
2. Have the students complete the attached hand-out at home. Allow them approximately 4 days to complete it.
3. Once students return with the hand-out completed, facilitate a class discussion on the results.
4. Create a display of chemicals and solid waste products that aren't meant to be put into a septic system. Have students create posters that promote a healthy septic system. Display them around the classroom or allow students to bring them home to remind family members to be kind to their septic system.

Evaluation

Evaluate students by their knowledge of septic systems and how to take care of them,based on the completion of the hand-out and classroom participation.

Extension

- Have students develop a mini-booklet on how to take care of a septic system. Distribute it to community members.



Know Your Septic System: A Questionnaire

Please answer the following questions:

1. Where is your septic tank located? Where is your leachfield located?
2. Is there a patch of moist green grass on the leachfield? Why would there be more green grass there?
3. Are there trees, shrubs, or a vegetable garden planted on or near the leachfield? How could the trees and shrubs effect your septic system?
4. Does anyone park their car on or near the septic tank? Could this damage the system? How?
5. When was the last time your septic system was cleaned out?
6. In an average week in your household what types of waste go down your drain? Household cleaner, food scraps, colored toilet paper, detergents, etc?.. How do each of these items affect your septic system? Can they damage it?
7. Do any of your drains clog up or drain slowly? What could this be a sign of?
8. What can you do to protect your septic system? Please list three suggestions.

Keep Your Septic System Healthy: Do's and Dont's

DO cover your leach field with a healthy bed of grass.

DO **reduce your water usage**; running too much water floods the leachfield and the pipes can clog.

DO **pump your septic system** every 3-5 years, this reduces clogging.

DO **add baking soda** to your septic system. It helps to feed the tank so it doesn't clog.

DON'T plant trees, shrubs, or a vegetable garden near your leachfield, the roots can clogs the pipes; vegetables can absorb toxins.

DON'T park on or drive over the septic system because it can damage the pipes leading to the leachfield.

DON'T use a garbage disposal; it wastes water and the food scraps can clog your septic system.

DON'T pour harsh chemicals down the drain; these chemicals kill the bacteria that break down the waste in the system. It's like pouring dangerous chemicals into your own backyard.

DON'T use colored toilet paper; it's harder for your septic system to digest.

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Hazardous Waste in Our Homes

Activity Facilitate the exploration of hazardous waste and common disposal methods through class discussion and group work.

Lead-in Ask students to cut out pictures of hazardous chemicals from old magazines. Examples are: detergents, household cleaners, paint thinner, pesticides. Have each student write a paragraph explaining how these products hurt the environment. What happens to household hazardous wastes if they are poured down the drain or put on a lawn?

Development

1. Discuss the meaning of *toxic* and *poisonous* with students. Point out that many items we use are poisonous and could harm us and the environment. Site examples that the children wrote about when getting started. Point out that these toxic materials are usually expensive and that cheaper and safer alternatives often work just as well.
2. Distribute the "Safer Alternative" information sheet and go over it with students. Have they seen any of the items used in their homes? Would their family be willing to try some of the safer alternatives? Which ones? Why? Why not? Brainstorm ways in which safer alternatives could be made more convenient.
3. Have students create illustrations, jingles, or skits advertising the safer alternatives.

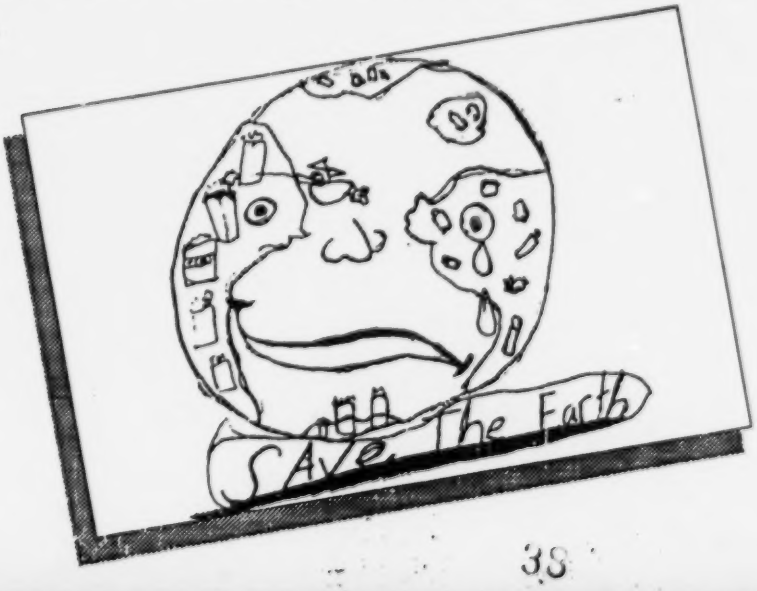
Evaluation

Evaluate students by their ability to participate successfully in class discussions as well as their knowledge of safer alternatives through their jingle, skit or illustration.

Extension

- Have students compare the costs of toxic products with an appropriate safer product. This may be done in pairs, at home, or with a parent. Be sure to have the store manager's approval.

Adapted from *The Solid Waste Management Resource Guide for Massachusetts Schools*.



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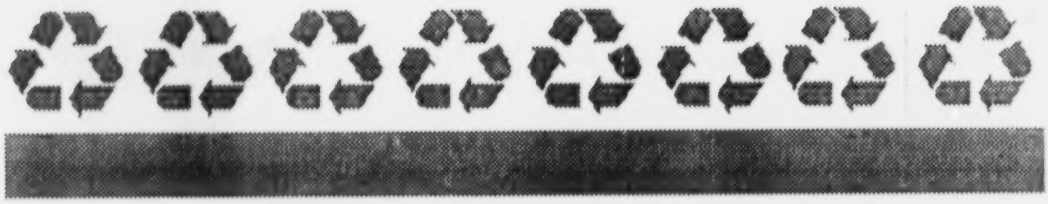

RECOLOGY

a curriculum developed for

Westminster Elementary School

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Fundamental Action
to Conserve Energy

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Starting at School and at Home With a Recycling Report Card/Survey

Objective to define recyclable, and evaluate current local performance of existing recycling programs
Skills questioning, evaluating, predicting

Getting Started

Begin discussion by asking what recycling is and why we do it. Try to direct consideration to Westminster specifically. What materials are collected in the school, in the home.

Procedure

Expand the discussion to consider whether everything is being recycled, and in the best way possible. List all the items recycled at home and at school. Discuss how we know that we are doing the best job possible- some answers may be : is there someone who wants to buy the material, is there a lot of it, is everyone helping, etc?

Ask: How do we know what we should be recycling?

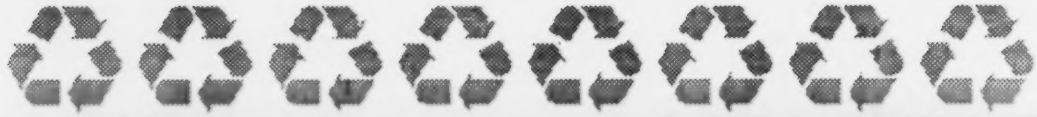
Note: markets and programs determine specifications for recovered materials. It is necessary to continually check that the material collected meets the requirements of the people who remanufacture it. It is important to know what qualities and limits apply, and what to do to find out. One of the goals of this discussion is to show that not all materials labeled recyclable actually are, and whether it is recoverable depends on who is actually using it.

Ask: Is this recycling program in school, and your recycling at home, the best it could be? The new meaning of best can attempt to determine what the ideal would be, how much could be recycled, and what we need to change in order to be able to do it.

Ask: What materials come into the school and the home that are not being recycled? How do you know if something can be recycled or not? How could you find out?

Suggest: Let's design a report card for what we can recycle and how we go about it. A report card like this requires us to ask questions so that a fair grade can be determined. Let's develop some standard questions for a survey to help us be sure about each item on the card.

FACT 1



A Garbage Report Card

Is it collected?	yes ❒	no ❒
Is it recycled?	yes ❒	no ❒
Is it worth money?	yes ❒	no ❒
Can all of it be used?	yes ❒	no ❒
Does everyone want to do it?	yes ❒	no ❒

Rank and evaluate responses to each "recyclable" on the report card.

Products

1 Report card for recyclables.

2 Survey introduction.

Evaluation

Compile and graph survey results. Form an opinion of the validity and significance of the survey and write a critical report about the process.

Extension

- Compare results between classes. Why are they the same, different? Determine if results are compatible with information collected by other surveys or methods of gathering opinions by reviewing previous surveys done by other groups.
- What new questions can be developed and tested in a followup survey? Produce a list of questions which address the problems identified in the first survey. What would be the next step?

How Much Are We Recycling in Our School?

Objective to have students measure, count, record and maintain records of recycling in school
Skills basic weighing, measuring, calculating, and record keeping

Getting Started

Ask students how many pounds of recyclables they produce, require each to guess and record the guess. Ask how to determine each week how much is produced.

Procedure

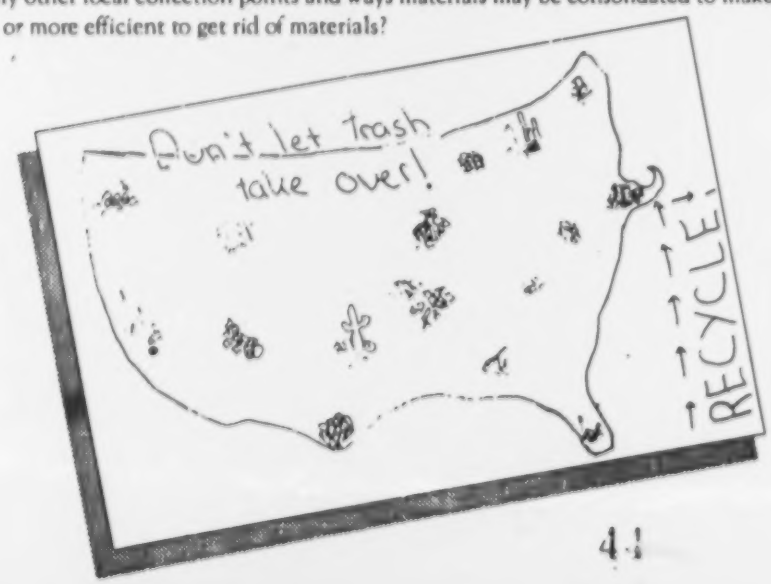
- Teachers and students working together develop a weighing program and a recording method.
- Develop a "waste-o-meter", a handmade graph recording weight of recycled material over time.
- Develop a school wide reporting program beginning by having each class record on a one day per week basis the liquid and paper waste from their snack, or for older grades, lunch.. A new barrel liner would be inserted each Monday to facilitate the activity. Each class will elect a representative to an environmental
- group whose first task shall be to prepare a chart for the whole school. This chart will display the weekly amount recycled and cumulative total for the year. If possible a comparison to last year's program will be included.

Evaluation

Amounts recorded should show increased percentage recovered and reduction in overall totals produced. Problems will be noted by the classes and the school wide committee. Representatives can discuss what is happening and solutions in class and in the larger group. Solutions will be suggested and tried.

Extension

- Ways to make program more/bigger/better, and barriers like poor quality control, lack of markets, lack of desire may be considered.
- Economies of scale which allow lower costs for larger volumes of material handled may be considered. Identify other local collection points and ways materials may be consolidated to make it more possible, easier or more efficient to get rid of materials?



What Are The Methods and Choices For Handling What We Throw Out?

Objective Students will consider and evaluate "trash" disposal methods, determine some choices people have in what methods are used to avoid or get rid of trash.

Skills conceptualizing, planning, evaluating.

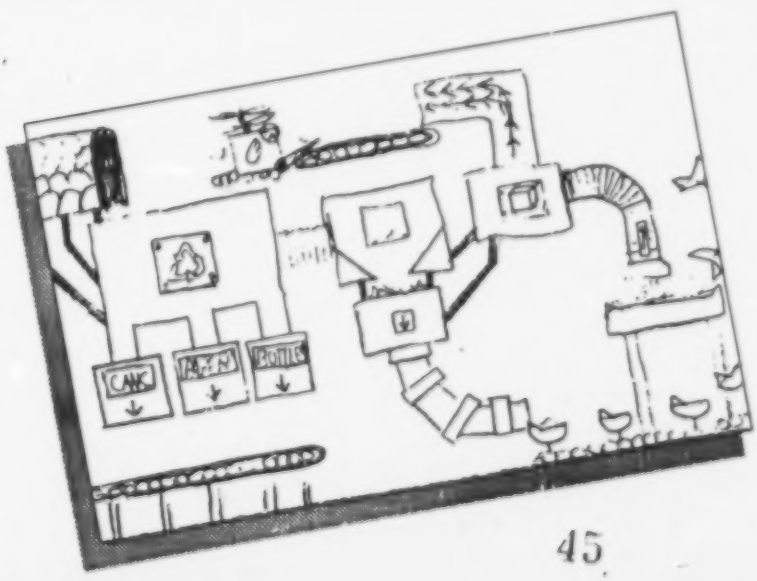
Getting Started

Begin discussion by asking if anyone has an idea about how many ways there are to dispose of things we buy once we're done with them. What does the phrase "the 3R's: reduce, reuse, recycle" mean?

Procedure

A commonly used outline of solid waste disposal methods includes reduction, recycling, incineration, and landfilling.

1. The phrase "reduce, refuse, precycle" describes the first consumer/buyer/user choice---reduction. Consider suggestions students have of how to buy less waste. For instance, purchase larger sizes or more concentrated products. Reduction is usually considered the top of the list of disposal methods, but is it really a method?
2. The technical difference between reuse and recycling is that reused materials remain comparatively unchanged, and the same or a new use is found for them. Recycled materials are reprocessed or remanufactured into new products. Think of some examples of each method. What works best and why?
3. Landfilling and incineration/combustion/burning complete the list of disposal methods. Burning is often called Resource Recovery or Waste to Energy because the heat can be used for power generation. Landfilling actually stores material in a relatively unchanged state for very long periods.
4. What is the history of waste management methods? What methods have been used in Westminster, in the area? What methods have been considered?
5. Choose a common product which everyone is familiar with. Track that product using the reduction, reuse, and recycling methods- how much is left over after a 3R alternative is used?



6. Apply the same test to the incineration method. An experiment in class can demonstrate that by burning something there is a smoke and ash byproduct.
7. Landfilling does not reduce the weight of material, and in most cases material does not change, or biodegrade significantly, under the conditions found there. Review some characteristics of landfills.

Evaluation

Produce a chart showing advantages and disadvantages of the methods of disposal. Using the report card format, grade the methods.

Extensions

1. Studies by archaeologist William Rathje may be reviewed which have determined quality, quantity, and changes in the waste stream. He has drawn conclusions about what conditions may be expected in landfills (see Scientific American article reprint, National Geographic article, book, etc.)
2. Develop a role play in which proponents of a particular waste disposal method propose starting a facility in Westminster. Ask a team of students to represent the community, and develop three or four team presentations for alternatives.

Taking The Report Card Outside
Can We Develop a Report Card for Other Environmental Issues?

Objective Students will analyze attributes of four aspects of the environment in the community—earth, air, water, and man-made environment.

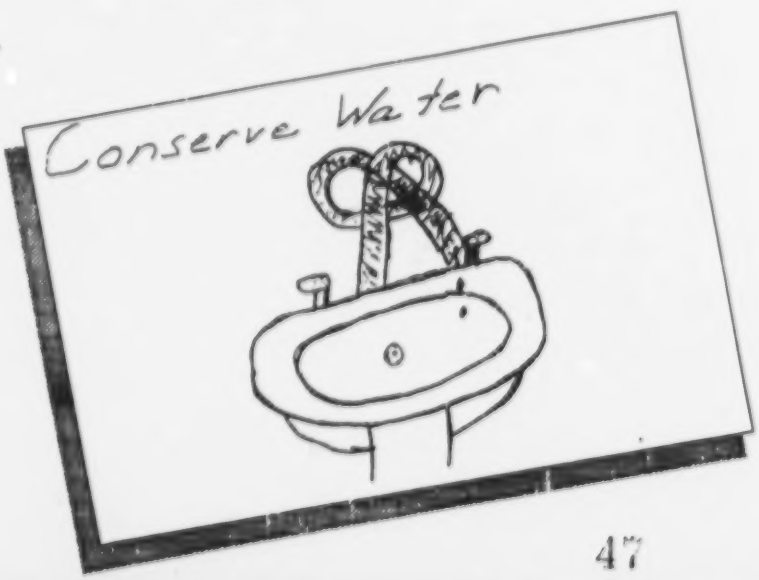
Skills creativity, planning, thinking critically.

Getting Started

Discuss some student opinions of what the word *environment* means. Brainstorm descriptions of the four aspects—earth, air, water, and man-made—in Westminster.

Procedure

- Define characteristics of each area of the environment. What makes up the earth? What types of soil exist in Wesminster? What covers the soil? What impacts the quality of soil? What lives there?
- What makes up air? What can change it? What can improve air quality? What uses the air, and how?
- What makes up water:What are sources of water? What is ground water? What lives in water? What water resources does the community rely on? What can change the quality of water?
- What man-made environments exist in the community? What are buildings made from? What about things like sports areas like ball fields or courts, how do these impact the surroundings?
- Find interrelationships between various characteristics of the four aspects.
- Develop a report card/survey to determine the status or quality of the characteristics discuss. The survey may be intended for home or the school grounds. The school wide committee will take question suggestions from the classes and put together a uniform survey which the classes can then give to each other. Data will be collected and scored by the classes. A report will be prepared with written results and the charted data, documented with pictures if possible.



Evaluation

Products include a report card/survey. Students can write a final result presentation to share findings.

Extension

- A report presentation can be given to parents and other interested participants such as community representatives in the recovery group as a summary. Findings may be discussed, and a debate to determine ways to change the problems may be included.
- Volatile social issues often require a diplomatic approach. Students may devise a positive campaign (of manageable proportions to keep the scope from being overwhelming) to convince the maximum number of people to take a position on an issue.

Finding Things Out In The Community
If We Like Them Or If We Don't, What To Do

Objective Students learn how to prepare results of their study for discussion in the community, how to present and to whom. Students will anticipate and prepare for acceptance and barriers, and analyze stakeholder issues.

Skills organization, cooperation, research methods

Procedure

- Students will use the information collected in Lessons 1–4 to present at a town meeting or before a town board/committee.
- Using skills and information developed in previous lessons, students will organize the data by asking "What did we find?".
- Presentation materials will be developed based on the audience, and a critical review of the process will include things done well, and things which need improvement in order to draw accurate conclusions.
- The presentation may include several of the following techniques, possibly developed by classes with some overall review in order to reduce redundancy.

1. Skit using charts, graphs, pictures.
2. Video tape in a news or reporting style.
3. Debate or discussion on ways to improve an identified problem.
4. Video or audio recorded interviews with administration and support staff on solutions or ideas for improvements.

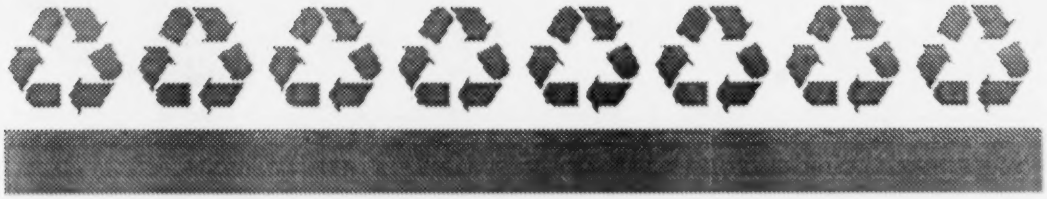
5. Charts, graphs, and public display materials for a local business with suggestions for community involvement.
6. Visual portrayal of a positive scenario taking place in the future which incorporates desired changes.
7. Identify community individuals who support conclusions and arrange for them to appear and testify for a proposal.

Evaluation

Solicit feedback from the persons witnessing the presentation.

Extension

Follow up on recommendations and support action which actually results in change.



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Recology Unit Plans

This project is a continuum. Each of the five segments or Unit Plans should highlight critical points or stages in this continuum.

We have five grades in Hawthorne Brook Middle School, covering a wide range of abilities and interests. Five units are proposed, containing a variety of activity choices centered on a theme or focus. These can be expanded or contracted accordingly with extensions noted or your own creative ideas. There is considerable opportunity to integrate these units into a variety of subject areas—math, science, language, social studies, and reading, where they can because the subject matter is not an added task. There is also plenty of opportunity to develop the spaces between the stages in the continuum.

Before these units are introduced to the students, there will be opportunities to introduce them to the faculty and work with participating teachers. A plan can be developed to include the units in an in-service before the Phase Three implementation.

Teachers will be provided with background information to help them prepare for this project. The resource collection which will be one of the products of the Recology Program will become a primary tool.Two primary resources are cited continuously throughout—the *Massachusetts Solid Waste Management Resource Guide*, and *Waste Away* from the Vermont Institute of Natural Science.

Schedule

A. Introduce the project to faculty.

B. Announce the project to participating classes. The criteria for participation is a combined interest on the part of the teacher and students. Distribute background material to teachers.

C. Send 'Teasers' home to parents in Tuesday notices.

D. Write a letter to parents of participating students outlining reasons for project, project overview, and what will be expected.

E. Complete the pre-survey in the whole school.

F. Appoint a student secretary in each of the participating classes to keep records of meetings, logs of events, and statistical records.

G. Complete the 5 Unit Plans.

H. Complete the post-survey.

I. Have a celebration!!!

What Is Waste?

Objectives Examining sources of solid waste, students will
- observe, identify, categorize, and define solid waste.
- calculate how much an average family/person dispose.
- realize personal involvement (I see & forget. I do & remember)
- understand the source of the waste.

Focus Complete a survey of waste at home.

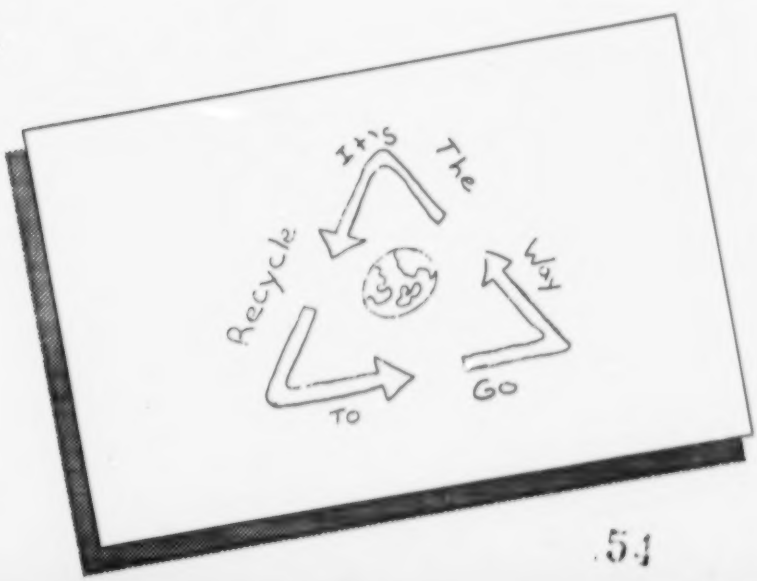
Activities The following activities will utilize many skills, such as brainstorming, weighing, recording, categorizing.

Pre-home survey

- View waste video from resource library.
- Complete a vocabulary lesson (i.e., *Waste Away* pp.24-25).
- Observe waste at home prior to the take-home survey to provide subject material for classroom preparation.
- Devise a standard tabulation sheet.
- Discuss methods of weighing, measuring, and storing waste for a week.
- Discuss ways to list types of trash (survey week will vary according to local pickup day).
- Answer "what if" questions such as "What if I have a garbage disposal?"

Survey

- Collect, list, weigh all home waste (including recyclables).



Post-survey

- Calculate averages; do projective math. Subject matter for these lessons may be found in *Massachusetts Solid Waste Management Resource Guide* (MSWMRG), pp. 79-81, 83-86.

Evaluation

Repeat measuring process at end of project to see if there is a measurable decrease.

Extensions:

1. Do surveys in classroom and cafeteria (check with custodians). See *Waste Away*, pp. 40.
2. Define trash.
3. Compile waste list and categorize. Discuss and use such categories as plastic, paper, cardboard (packaging, biodegradable/non-biodegradable, renewable/non-renewable), raw materials. See MSWMRG, pp. 61-65, 67, 69-72, 143, and *Waste Away*, pp. 38.
4. Discuss waste as a byproduct of manufacturing. See MSWMRG pp. 87-88.
5. Discuss the particular characteristics of hazardous waste, how is it alike, and how different? Invite a speaker to address this special issue. See MSWMRG, pp. 97-109.

Where Does It All Go?

Objectives Students will understand the current methods of disposal and their consequences and problems. What happens to waste after it is thrown away.

Focus Understand problems with current methods of disposal.

Activities

Examine the history of disposal methods, discuss current technology.
See MSWMRG, pp. 131-135, 147-150.

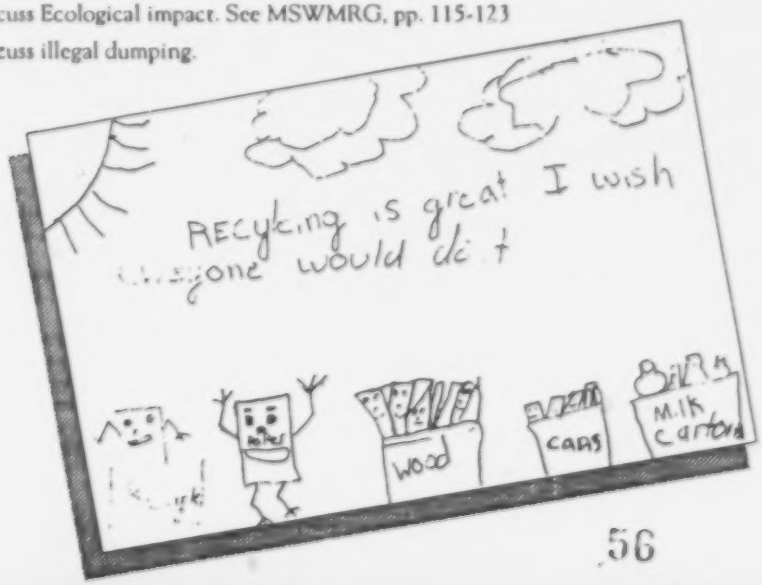
- Consider landfill histor— the oldest method. See MSWMRG, 171-174.
- Consider incineration/combustion; resource recovery and waste to energy plants convert material to heat. See MSWMRG, pp. 169-170, 197-198.
- Understand current problems such as leachate, ash, NIMBY and other restrictions on space.
- Introduce point of view speaker/forum presentations by local representatives of proponents for a particular technology, ie TIRU, Wheelabrator, Ogden Martin, or BFI (incineration) ; Resource Conservation Inc, RCI, (landfill). Local Board of Health may talk about the transfer station, which is not a technology but an accumulation and aggregation point.

Evaluation

Develop a graphic display of disposal method. The summary may show evolution of current methods, advantages and disadvantages, and associated problems.

Extensions

1. Recognize solid waste hierarchy—Reduce, Recycle, Incinerate, Landfill. Determine origin of this order and justify/criticize.
2. Take a field trip to the town landfill. See MSWMRG, pp. 247-253, 199-202 (mini-landfill), and 245-246 (NIMBY).
3. Discuss Hazardous Waste storage and treatment problems. See MSWMRG, pp. 97-109.
4. Discuss Ecological impact. See MSWMRG, pp. 115-123
5. Discuss illegal dumping.



Is Waste Our Fault?

We Live in An Era Where the Adage, "Waste Not, Want Not" Has Given Way to: "When In Doubt, Throw It Out." Waste Away, p. 28

Objectives Help students realize that waste values are cultural, and that their own current attitudes may make them a significant part of the problem.

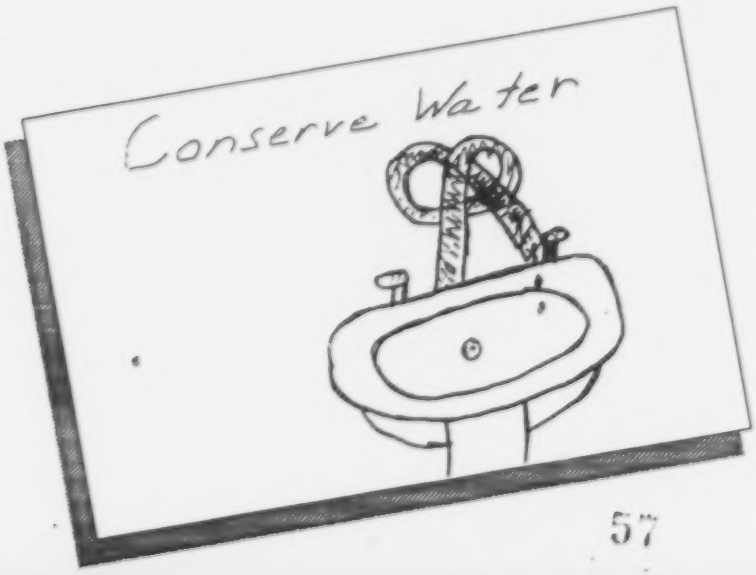
Focus Examine personal and cultural behavior and values.

Activities

Discover attitudes which are reflected in literature. Students will read and discuss some of the following selections.

1. "Pigopolis" (available from Fitchburg Gas & Electric Co.)
2. "The Lorax," see MSWMRG pp. 113. Available as Hawthorne Resource, Chris Barnacoat, HRCB.
3. "Just A Dream," Chris Van Allsberg, HRCB.
4. "Askami's Story, The Four Laws of Nature," *Waste Away*, pp. 42-43, 59.
5. "Sarah Cynthia Sylvia Stout," *Waste Away*, pp. 83.
6. "Play", *Waste Away*, pp. 12-14.
7. "Chief Seattle," MSWMRG, pp. 73-75.
8. "The Ox Cart Man," HRCB.
9. "Brother Eagle, Sister Sky," HRCB.
10. "Waste Now, Worry Later," MSWMRG, PG. 47-48.
11. "The River Ran Wild," Lynne Sherry, HRCB.

- Make a list of attitudes and ask students to see which they share/don't share.
- Determine attitudes past and present, how have they changed? See *Waste Away*, pp. 41 senior citizen interview. Also MSWMRG, pp. 139-142.
- Things are made to be thrown away, disposable—but are they? Develop a collection of simple items and investigate larger ones.



Evaluation

- Create class stories dealing with attitudes using a team approach. The final product will be several stories representative of class ideas.
- Create an attitudinal survey to administer to school faculty.

Extension

1. Investigate a variety of products and discuss and show how attitudes effect the production and disposal of the products.
2. Consider lifecycle analysis of a product like disposable diapers. Is paper better than cloth?
3. Discuss the plastic vs paper bag controversy. Is it possible to determine which is better? What are the factors involved?

What Can We Do About the Problem?

Objectives 1. Understand the expression, "one person's trash is another person's treasure."
2. Conclude that there are clear alternatives with plenty of scope for improvement.

Focus Define the 3R's—Source Reduction, Reuse, Recycle (and Compost) and demonstrate a relationship among them.

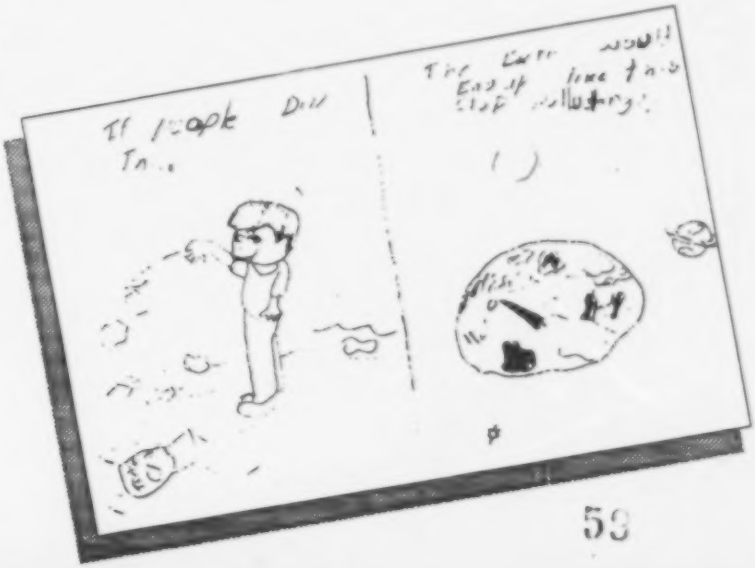
Activities

Using the reduce, reuse, recycle concepts, find how economics and efficiency factors effect waste.

- Explore the idea of Trash or Treasure. See MSWMRG, pp. 179-180.
- Consider the source reduction summary—reduce, refuse, precycle. See MSWMRG, pp. 153-156, 181-182, 207, 209, 211-214.
- Define 'going green' manufacturing. What is the effect on consumerism? If people make informed choices, manufacturers make changes. Use local representatives from Mass Audubon Society and a business like a supermarket to discuss what changes could and should be made.
- Differentiate the specifics of reuse and recycling. Recycling technically requires remanufacture or reprocess of material. Reuse examples are plastic trays and scrap paper. MSWMRG, pp. 177, 193-194. Recycle see MSWMRG, pp 157-166, 193-194, 215-216, 217-220.
- Research the principles of composting, handling the organic component of the waste stream. See MSWMRG pp. 167-168, 195-196, 235-243.
- Consider what and how materials can be handled at school. The Townsend system handles a number of commodities. Can the school collection system be linked to the town system?

Evaluation

1. Develop an improved waste disposal management plan (MSWMRG, pp. 135-137) for display/publication.
2. Include results of the post-survey from Unit Plan I in the management plan.



Extension

1. Visit a supermarket to look at how they deal with their waste, and look carefully at the packaging used. How could items be packaged differently? What needs to be done to recycle the material?
2. Detail myths and problems in recycling. Do" Road Block Game", MSWMRG, pp. 231-234.
3. Research how the law is involved in the 3R's. Examine support laws, initiatives, pressure group letter writing, and voting, which change policy and incentives.

Spreading the Message!

What does it take to get public acceptance of, and full participation in, a solid waste disposal management plan?

Objectives Realize you can play a major role in solving the problem. How can you change yourself and influence others? Each class will develop a 'product' which showcases what they have learned and will spread the word outside of their environments.

Focus Determine what needs to done and undertake appropriate action.

Activities

Deciding on an appropriate course of action involves considering the complex interaction of what is desireable, necessary, and possible within a timeframe.

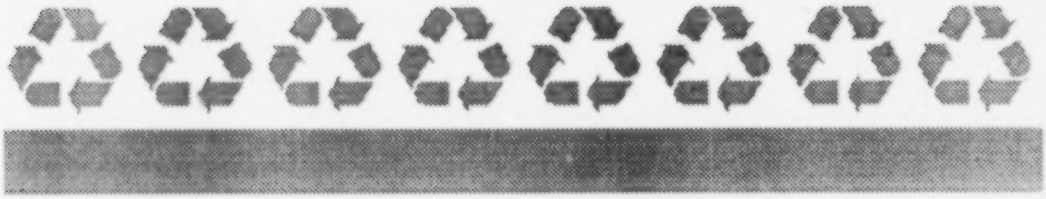
- Devise an individual/family pledge sheet. See Homebooklet, Waste Away, p. 10.
- Compile a list of tips for 'going green' for local business and circulate it.
- Design a packaging display: wasteful vs appropriate, also could be what is recyclable- and get permission to show it in a public place perhaps Victory.
- List reasons to change habits and values posted in the school and community.
- Write a guide book for Townsend recycling in cooperation with the recycling committee and send a copy to every household in town.
- Research aspects of home composting and vermiculture; present a workshop for another class on methods.
- Make a video with past, present, and future of recycling in some specific local context.
- Compose journalistically sound newspaper articles about the recycling project at every stage, especially final results, and get them published.
- Design and demonstrate house-based recycling systems.

Evaluation

Elicit formal and informal response to the projects undertaken by the school. Perhaps a list of questions could be addressed to a panel composed of local people including the Recovery Committee at an assembly which could also be used as an awards presentation opportunity. How could the program be improved? Can and will it be extended? What were the major benefits? Were timelines and goals met, and if not, why not? What conclusions were reached during the different unit plans?

Extension

The extension of this unit will most logically occur during future years, as the scope of the projects undertaken builds on previous experience. The unit is intended to incorporate what is accomplished in the school in a broader context of the community. The community grows and adopts to more thorough understanding of mutual interest with the school in resolving resource conservation and ecological issues.



RECOLOGY

a curriculum developed for

Memorial Middle School

by FACE
Fundamental Action
to Conserve Energy

Acknowledgments

- Recology is the name coined by Fred Meshna at North Middlesex Regional High School and used by FACE to describe its pilot curriculum linking studies and practical activities in recycling and waste management in six Central Massachusetts schools.

- Funding for the **Recology** project was made possible by a grant from the Environmental Protection Agency.

- The lesson plans contained in this book were created under the auspices of FACE especially for Memorial Middle School by Lisa Petel assisted by Ron Gaudreau.

- The **Recology** illustrations were created for FACE by students at Ashby Elementary School, Ashby MA and by the children of employees at NEBS.

- Portions of this project were adapted with permission: *Waste Away* Program, Vermont Institute of Natural Science, Woodstock, VT; and reprinted with permission from the October/November 1992 issue of GARBAGE Magazine, Gloucester, MA.

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FACE
Fundamental Action to Conserve Energy
75 Day Street
Fitchburg MA 01420
508-345-5385

Cross-Curricular Links

English

- Discuss language issues of writing survey questions.
- Help students write final report.
- Introduce students to a different kind of writing task.

Social Studies:

- Help students decide what neighborhoods need to be targeted for the survey.
- Facilitate the exploration of Fitchburg's neighborhoods through map exercises.
- Introduce students to cartography. Produce a map for the final report (optional).

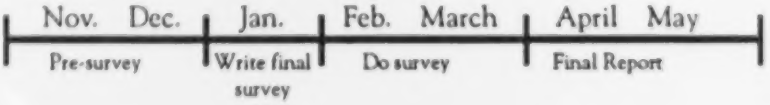
Science

- Help students develop investigative survey and draw conclusions based on their findings.
- Facilitate the practice of scientific investigative research techniques.

Math

- Help students compile and interpret data received from the final survey.
- Reinforce students' knowledge of percentages, basic math, and graphs.

Time Line



If you devote 1 hour a week to developing the survey it can be completed by May 1993.

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A First Survey

Objective Facilitate the development, administration, and evaluation of a mini-survey in class, in order to familiarize students with survey procedures.

Lead-in Ask students how many of them have ever taken a survey. Count how many have and how many have not; put totals on the chalkboard. What can students derive from this information? Let them know that they have just taken their first survey!

Development

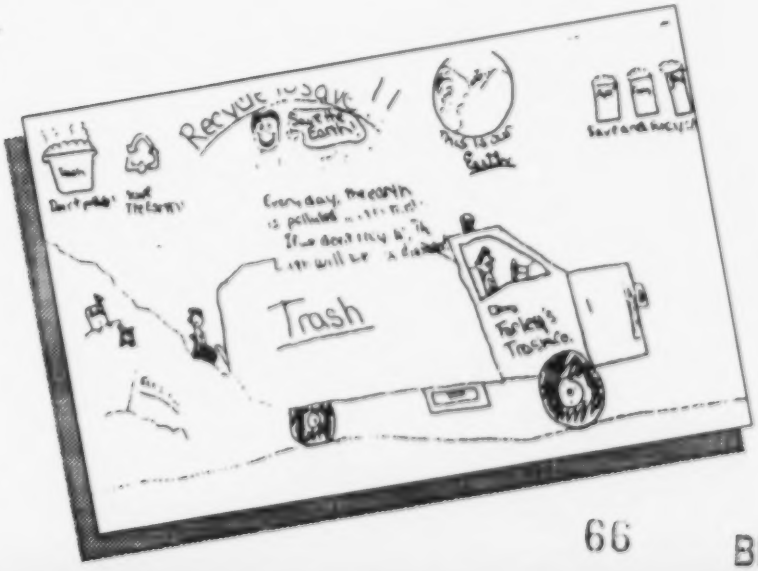
1. Ask students to come up with one question that they would like to ask another student. Example: What is your favorite color? Do you have a pet? What kind? Have students develop five questions.
2. Put students into groups of four, mixed by gender and ability.
3. Have students ask each other the five survey questions they developed.
4. Ask groups to compile their data.
5. Have each group present their conclusions; write these on the chalkboard.

Evaluation

Evaluate students by the successful completion of the classroom survey.

Extension

- Ask students how an advertising agency would use this information. Example: If the majority of students' favorite color is green, would advertisers be wise to use more green in their advertisements?
- Have students administer the mini-survey they developed to their parents or other adults. Compare the adults' answers with those of the students. Differences? Similarities?



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Does Curbside Recycling Work?

Objective Students, working in groups, brainstorm investigative questions about the local curbside recycling program. They will use this information later to help them develop pertinent survey questions.

Lead-in Ask students to guess how many people in Fitchburg recycle (population: 41,194). How many go to the landfill once a week to recycle what curbside doesn't? What would be one way to find out the real percentages? A SURVEY!

Development

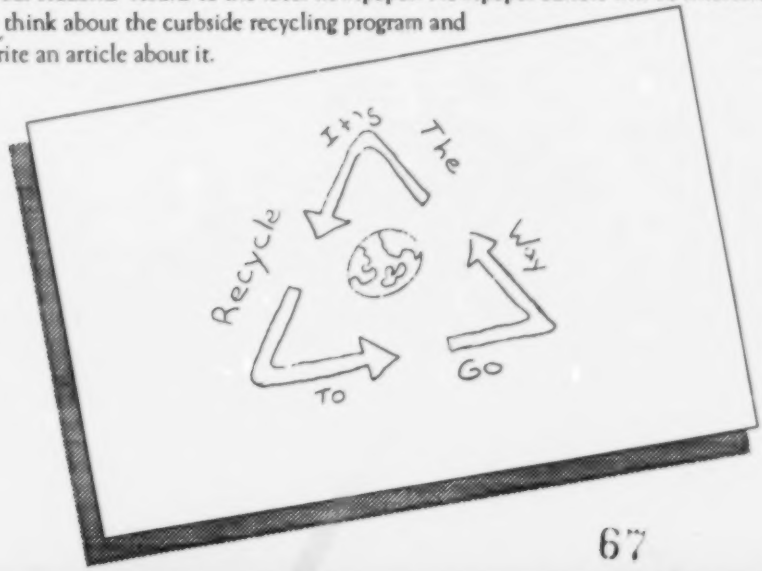
1. Put students into groups of 3-4, mixed by gender and ability.
2. Have them brainstorm as many questions as they can think of that would need to be answered in order for the city to improve its curbside recycling program.
3. Once questions are completed have students, still working in groups, rank them in order of importance, "#1" being most important.
4. On the chalkboard list each question in order of importance. Each group will read their "#1" and you list it, then "#2", then "#3", etc..
5. As a class have the students reach consensus as to which question out of the "#1"s is most important or valuable to ask. Repeat the exercise with "#2"s, "#3"s, etc.
6. Once the list of questions has been fine-tuned by the class, have students each ask at least 5 people, outside of the classroom, these questions.
7. The answers they receive will enable them to later focus their survey questions on issues that they know are important to people in the community.

Evaluation

Evaluate students by their successful completion of the mini-survey, as well as their ability to work productively in groups.

Extension

- Send your students' results to the local newspaper. Newspaper editors will be interested in finding out what people think about the curbside recycling program and may write an article about it.



Polishing Survey Questions

Objective After completing an investigative survey, students working in groups will decide what issues are most important as a focus for the final survey. They will base these decisions on the data retrieved from the initial investigative survey, as well as their own brainstorming of survey questions.

Lead-in Facilitate a student-led discussion on how to write survey questions. What length should they be? Is there certain wording to use? Show students examples of survey questions. Have the class reach consensus on which survey model to use.

Development

1. Facilitate a teacher-led discussion on the results of the investigative survey. Help students reach consensus on five major categories for the final survey focus.
2. Put students into five groups of 3–4 students mixed by gender and ability.
3. Assign to each group—or randomly pick from a hat or box—one of the five categories.
4. Groups will be responsible for developing ten survey questions which focus on their category. Each member of the group is responsible for contributing at least two survey questions. The survey questions are to be written in the approved format.
5. After the groups have developed ten questions, have students rank them in order of importance, "#1" being most important. The survey needs to be short in length so that people will be more apt to participate. This exercise will help students decide which questions they can eliminate.

Evaluation

Groups will be evaluated by their ability to follow directions and complete the task of developing ten survey questions. You can give a group grade or ask that each student submit at least two questions for an individual grade.

▸ Extension

Have a guest speaker from a marketing research organization talk to students about how the organization conducts surveys.

Fitchburg's Diverse Neighborhoods

Objective Facilitate a study of Fitchburg's neighborhoods, through map exploration and group work, so that the curbside recycling survey is distributed properly to all major neighborhoods. This exercise also increases a student's knowledge of the city and helps to breakdown stereotyping of neighborhoods.

Materials Large map of the city, markers, push pins, individual photocopies of city map for students

Lead-in Take a mini-poll of what neighborhoods students live in. Record findings on large map. What neighborhoods are left out? How would this affect the results of a survey?

Development

1. Break students into groups of 3-4 mixed by gender and ability.
2. Ask each group to divide their small map into major neighborhoods. Groups need to reach consensus as to where those major neighborhoods are.
3. Have groups create profiles of three of the neighborhoods by answering the questions on the *Neighborhood Questionnaire*.
4. Once completed, have students justify why their three neighborhoods need to be surveyed, using the answers to the *Neighborhood Questionnaire* as the support for their argument.
5. After all the groups have presented their information, have the groups work together to reach a consensus as to what neighborhoods must be targeted for the survey and how to get students to distribute and collect the survey.
6. Mark off neighborhoods on the large map with push pins.

Evaluation

Evaluate students by the successful completion of the *Neighborhood Questionnaire* and their justification for that neighborhood's significance to the survey.

Extension

- Have students conduct their own survey on any subject, manipulating the data in some way in order to produce a desired outcome. Example: Only survey women or men on a certain subject. How does this affect a survey?

Looking at the Data

Objective Once the survey is completed, students working in groups will compile the data and transform it into a final report through the use of graphs and evidence extracts.

Lead-in Ask the group as a whole to make some guesses or predictions about what the results of the survey will be. Read and check when data is compiled.

Development

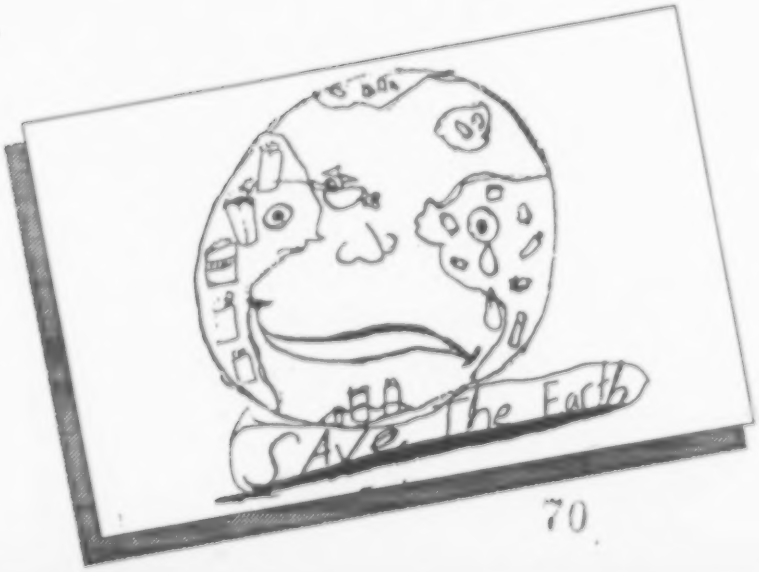
1. Hand-out evidence extract; review directions with students.
2. Put students into groups of 3-4, mixed by gender and ability.
3. Divide the number of questions by the number of groups. Each group is assigned this many questions.
4. Groups will be responsible for compiling raw data.
5. Once the raw data is compiled, groups need to interpret the data by creating a graph and completing an evidence extract.
6. Once 3 evidence extracts have been completed by each group they can present their findings through an oral presentation using their evidence extracts and graph as tools for proving their findings.

Evaluation

Students will be evaluated through the successful completion of a graph and three evidence extracts.

Extension

Have students take the raw data and transform it into several different kinds of graphs—bar, pie, etc. Does this change the way the data is interpreted? What function do graphs serve?



Fact Finding in Fitchburg

After compiling the raw data from the survey your group needs to interpret your findings. Example: If your data shows a certain neighborhood is recycling less then the others, why is that? What is different about that neighborhood? Is it a language barrier? Are there a lot of multifamily homes which can't participate in the recycling program? Use your group's knowledge and expertise about your community to develop carefully considered conclusions about the survey.

Directions

Read a survey question aloud to the other groups members along with the raw data you compiled for that question. Brainstorm as many conclusions as you can for that question. Now rank your answers in order of most important to least important.

Question 1 Raw Data=	Question 2 Raw Data=	Question 3 Raw Data=
1.	1.	1.
2.	2.	2.
3	3	3
4.	4.	4.
5.	5.	5.
6.	6.	6.

Recology Resources

REGIONAL

MassRecycle
P O Box 3111
Worcester MA 01613
(508) 342-6918
Contact: William Stanwood

Fitchburg/Westminster Recycling Organization
Fitchburg Road
Westminster MA 01473
(508) 874-0056
Contact:Heather Billings

Resource Control Inc.
P.O Box 550 Depot Road
Barre MA 01005
(508) 355-6826
Contact: Jane Southworth

Fundamental Action to Conserve Energy(FACE)
Ecology Store and Oil Coop
75 Day Street
Fitchburg MA 01420
(508) 345-5385
Executive Director:
William Stanwood

Nashua River Watershed Association
603 Mass Avenue
Lunenburg MA 01462
(508) 582-0922
Contact: Carolyn Sellars

Ray's Trucking Inc. (RTI)
49 Cobbler Drive
Fitchburg MA 01420
(508) 342-0430
Contact: Scott Lemay

CONCEWM
Ayer MA 01432
(508) 772-3490
Contact: Don Lerstikow

Regional Environmental Council
Box 255
Worcester MA 01613
Contact: Ted Conna
(508) 754-3374

One Person's Impact
5 Pirates Lane #5
Gloucester MA 01930
(508)281-8168
Contact: Maria Valenti

STATE AGENCIES

Executive Office of Environmental Affairs
100 Cambridge Street
Boston MA 02202
(617) 727-9800
Secretary: Susan F. Tierney
Office of Technical Assistance:
(617)727-3260

Department of Environmental Protection
One Winter Street
Boston MA 02108
(617) 292-5500
Commissioner:
Daniel S. Greenbaum
Recycling:
Robin Ingenthron
(617) 292-5962

Department of Environmental Management
100 Cambridge Street
Boston MA 02202
(617) 727-3680
Commissioner: Peter C. Webber
*Worcester County Regional Office (508) 368-0126

Massachusetts Water Resources Authority
100 First Avenue
Charlestown Navy Yard
Boston MA 02129
(617) 242-6000

Hazardous Waste Facility/Site Safety Council
100 Cambridge Street
Boston MA 02202
(617) 727-6629

Law Enforcement — Environmental
100 Cambridge Street
Boston MA 02202
(617) 727-3190
* To report violations call: (617) 727-6398

FEDERAL AGENCIES

U.S. Environmental Protection Agency/Region I
JFK Federal Building
Boston MA 02203
(617) 565-3420
Solid Waste Library
Fred Friedman
(617) 573-9687

Recology Resources (continued)

ENVIRONMENTAL GROUPS

Center For Ecological Technology (CET)
112 Elm Street
Pittsfield MA 01201
(413) 445-4556
Non-profit organization which covers Western Massachusetts for energy conservation and solid waste management.

Earthworm Inc.
Medford Street
Somerville MA 02111
(617) 628-1844
Non-profit organization which collects paper for recycling, offers educational services to residents of the greater Boston community.

Conservation Law Foundation
3 Joy Street
Boston MA 02108
(617) 742-2253
Private non-profit organization which promotes fair and conscientious environmental laws in Massachusetts

Harvard Environmental Law Society
Auston 20 Harvard Law School
Cambridge MA 02138
(617) 495-3125
Law students research environmental issues for the public.

Massachusetts Association of Conservation Districts
20 Maple Street
Randolph MA 02368
(617)-693-1162
Comprised of 16 local districts which promote the conservation of natural resources.

Massachusetts Audubon Society
South Great Road
Lincoln MA 01773
(617) 259-9500
This organizations goal is to preserve the quality of the environment so that we can live in harmony with nature.

Massachusetts Public Interest Group (MASSPIRG)
29 Temple Place
Boston MA 02108
(617) 292-4800
Non-profit organization dedicated to researching and organizing environmental issues. Local chapter resides on the Fitchburg State College campus.

INDUSTRY RESOURCES

The Aluminum Association
900 19th Street, NW
Washington D.C. 20006
(202) 862-5163

Aluminum Recycling Association
1000 16th Street,
NW Suite 603
Washington D.C. 20036
(202) 785-0951

American Paper Institute
260 Madison Avenue
New York NY 1001
(212) 340-0600

American Petroleum Institute
2101 L Street, NW
Washington D.C. 20037
(202) 682-8000

Council On Plastics Packaging In The Environment
1275 K Street, NW
Washington D.C. 20005
(202) 371-5228

Glass Packaging Institute
1133 20th Street, NW Suite 321
Washington D.C. 20036
(202) 887-4850

Institute Of Scrap Recycling Industries Inc.
1627 K Street, NW
Washington D.C. 20006 (202) 466-4050

Keep America Beautiful
Mill River Plaza
9 West Broad Street
Stamford CT. 06902
(203) 323-8987

National Center for Resource Recovery, Inc.
1211 Connecticut Avenue, NW
Washington D.C. 20036

Society of the Plastics Industry
1275 K Street, NW
Suite 400
Washington D.C. 20005
(202) 371-5244

Many of these industrial organizations offer free educational materials to schools. Contact their Educational or Public Relations Deptartment for more information.

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RECOLOGY SURVEY

School_____Town_____Gr._____Code___

How strongly do you agree? **Circle the number** that best describes how you feel. This is not a test. In this survey everyone wins.

1. I recycle ..... Little 0___1___2___3___4___5. Lot

2. In my home we recycle..... Little 0___1___2___3___4___5. Lot

3. In my home we compost..... Little 0___1___2___3___4___5. Lot

4. In our home we recycle:
   - Newspaper/paper..... Little 0___1___2___3___4___5. Lot
   - Aluminum..... Little 0___1___2___3___4___5. Lot
   - Glass..... Little 0___1___2___3___4___5. Lot
   - Plastic..... Little 0___1___2___3___4___5. Lot
   - Leaf and yard waste..... Little 0___1___2___3___4___5. Lot

5. My school recycles..... Little 0___1___2___3___4___5. Lot

6. In my school we recycle:
   - Newspaper/paper..... Little 0___1___2___3___4___5. Lot
   - Aluminum..... Little 0___1___2___3___4___5. Lot
   - Glass..... Little 0___1___2___3___4___5. Lot
   - Plastic..... Little 0___1___2___3___4___5. Lot
   - Leaf and yard waste/food..... Little 0___1___2___3___4___5. Lot

7. My town/city has a recycling program..... Little 0___1___2___3___4___5. Lot

8. This year I have gone to the recycle center.. Little 0___1___2___3___4___5. Lot

9. I would like to learn more about recycling.. Little 0___1___2___3___4___5. Lot

10. I would like to learn more about_____.

Thank You!

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RECOL°GY

Material Management Audit

RECOL°GY is a combination of teaching and learning through the interaction of conservation (material waste management and recycling) and ecology. Most simply it is a program designed to keep recycling efforts working in schools through faculty, student, and community participation.

The purpose of this four (4) week audit is to determine the type and volume of materials used, and how they are currently being disposed. This is accomplished by following four (4) simple steps. First, take an initial inventory of materials. Next, monitor additional materials which enter the school facility. Then, track all materials through the system to disposal and/or recycling. Finally, take an ending material inventory.

The results will show how the materials are broken down into different classifications. Each classification will then be designated to either be recycled or treated as a solid waste disposal material.

It is important for the participating school to understand that accurate record keeping is vital for the success of the program. The audit will allow the students to understand that volumes of materials are used in their school system. Also, that there related costs in handling and disposing of these materials. The goal is to have the students discover the benefits of recycling and of a well developed solid waste management program. This will provide the students with an opportunity to understand how easy and cost effective it is to prevent wasting our natural resources.

The following pages contain the necessary worksheets with instructions. If there are any questions, please feel free to call us for assistance.

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Recology Audit Materials Categories

PAPER

- COMPUTER
- WHITE
- COLORED
- NEWSPRINT/NEWSPAPER
- MIXED OFFICE
- PAPER SUPPLIES
  - *CAFETERIA/BATHROOM*
- SPECIAL COATED
- BOOKS
- MAGAZINES, WORKBOOKS

CARDBOARD

- CORRUGATED
- PAPERBOARD
  - *CEREAL, SHOE BOXES*

PLASTICS

- #1: PET , PETE
- #2: HDPE, CLEAR/CLRD
- #3: VINYL
- #4: LDPE
- #5: POLYPROPYLENE
- #6: POLYSTYRENE
- #7: OTHER

METALS

- ALUMINUM CANS
- STEEL /TIN CANS
- IRON/FERROUS
- NON-FERROUS
  - *COPPER*
  - *ALUMINUM, ETC.*

GLASS

- CLEAR/GREEN,BROWN
- PLATE
- SPECIAL
  - *Laboratory, High temp*
  - *Light bulbs, etc.*

CERAMICS

Dishes, Cups, Tiles, Pots

CHEMICALS

- CLEANING
- LABORATORY
- MACHINE RELATED
- WOODSHOP
- AUTOBODY
- PRINT
- CUSTODIAL
- FOOD PREPARATION
- MEDICAL
- OFFICE
- YARD, OUTDOOR

PAINTS

- WATER/OIL BASED
- THINNERS
- REMOVERS
- ART

WOOD

- CONSTRUCTION
  - *New & Repair*
- TREATED
- PALLETS
- DRAMA, SETS, EVENTS
  - drywall

FOOD

- FRESH
- CANNED
- FROZEN
- MEAT
- DRY
- CONDIMENTS
- BEVERAGES

PLEASE RECYCLE

Recology Audit Materials Categories

TEXTILES

- CLOTHING
- LEATHER
- PLASTIC, IE. VINYL
- CURTAINS, RUGS

RUBBER

- TIRES

BUILDING MATERIALS

- CEMENT
- ASPHALT

BATTERIES

- DISPOSABLE
- LEAD/ACID
- RECHARGEABLE

OTHER

- WHITE GOODS
- DURABLE GOODS= DESKS, ETC
- MEDICAL SUPPLIES
- MISC. OFFICE SUPPLIES

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Form 1

Ashby Waste Audit Week

TRASH BAG DUMPSTER Number of Rubbish Bags

FEBRUARY	Mon 22nd	Tues 23rd	Wed 24th	Thur 25th	Fri 26th
Kitchen Area					
General Collect					
Kinder-garten					
Other					

79

Form 2

Ashby Waste Audit Week

CORRUGATED CARDBOARD Count pieces daily

FEBRUARY	Mon.22nd	Tues.23rd	Wed. 24th	Thur.25th	Fri. 26th
Kitchen Area					
General Collect					
Other					

Form 3

Ashby Waste Audit Week

WASTE CHARACTERIZATION Number of Pieces/Weight/Vol.

FEBRUARY	22nd Monday	24th Wednesday	25th Thursday
White Construction			
Colored Construction			
White Composition & Duplication			
Newspaper			
Math Paper			
Yellow & Colored Duplication			
Misc. Beverage (aseptic)			
Paper Towels & Tissues			
Aluminum			
Misc. Plastic S - Snack 1 & - 2			
Misc. Other (pencils, etc)			

Form 4

Ashby Waste Audit Week

CAFETERIA TRASH COUNT

Plastic Trash Barrel Bag #s, wt., vol.

	FEBRUARY	Mon., 22nd	Tues., 23rd	Wed., 24th	Thurs.,25th	Fri., 26th
GARBAGE ORGANICS	LUNCH ONE					
	LUNCH TWO					
	LUNCH THREE					
PAPER	LUNCH ONE					
	LUNCH TWO					
	LUNCH THREE					
BEVERAGE	CARTONS ASEPTIC/ OTHER					
PLASTIC						
ALUM.	SODA CANS					

8.

85

RECOLOGY
Waste Audit Worksheet

School: _____ Department: _____

Contact: _____ Date: _____

Instructions This form is designed to outline all materials purchased. The purpose is to itemize a comprehensive list of materials which may be appropriate at some time for removal from the waste stream. It should be completed in no more than thirty minutes in the best detail possible. Please read through the attached material suggestion sheet which outlines many supply categories. Group similar types of items. An estimate of total annual usage would best describe period.

Material	Quantity	Units	Period
sample			
copier paper	*400 cases*	*10 reams/cs.*	*1 year*
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
26.			
28.			
29.			
30.			

Call _____with questions and return by_____.

RECOLOGY INVENTORY

School_____Date_____
Contact _____

Material	Units (cases,etc.)	Number

"The fate of the earth, quite simply, lies in the hands of man" Artist Marvin Mattelson

FIGBY

FINDING IN GARBAGE- BEAUTY

A CONTEST FOR RECOLOGY SCHOOLS

PURPOSE: your art work will be the voice that speaks for planet Earth. The endangered animals and land need you to tell all people, "Reduce, Reuse, Recycle!" Express your hopes for a healthy Earth through creative art made from "garbage".

PARTICIPANTS: the contest is open to students from three grade divisions and will be judged by division. Creative use of materials will be favored above technical ability.

SPECIFICATIONS: your work should reflect your interpretation of the beginning quote and the "purpose" of the contest. Your materials must be trash- items that have been thrown out. You may use a small amount of traditional materials (glue, paint, tape, etc.) to finish your work. The completed work must be submitted by April 15, '93.

Category I

2-D Two Dimensional Collage/Montage

1.dimensions can be up to 18" by 24"

2.only individual entries will be accepted in this category.

Category II

3-D Three Dimensional Form

1.dimensions can be up to 3 feet square, 3'x3'x3'

2.two subgroups

A.teams or classes
students are encouraged to work in groups of two or more.

B.single students may enter the 3-D category, and given a substantial number of entries, a separate prize will be awarded

AWARDS:

Category I, one $25. award for each division: K-4, 5-8, 9-12

Category II

A. one $50 award for each division

B. one $25 award for each division with three or more entries

Grand Prize among six schools in each Category and division $100

EXHIBITION: Your winning work will be displayed at the Mount Wachusett Community College...., and Fitchburg Art Museum....

ENTRY FORM WILL SHOW YOUR NAME, ADDRESS, PHONE, CLASS, GRADE, AND SCHOOL

One man's trash ...

IAN DONNIS

The grand-prize-winning project of Kelly Murphy, a fifth grader at Westminster Elementary School

Ecological art offers message

By Ian Donnis
Telegram & Gazette Staff

FITCHBURG — Trash from a number of area communities turned up yesterday at the Fitchburg Art Museum after being reincarnated by students as prize-winning artworks packing potent environmental messages.

A chewed-up baseball and a pair of old gloves were transformed by Kelly Murphy into the blue and green Earth, looking both vulnerable and strong, while being cradled in two human hands.

"I'm not just trying to say that our home is the Earth and that's the only place we could ever use," Murphy, a fifth-grader at Westminster Elementary School, said of her work, titled "All Our Fault."

Murphy's work was one of nine grand-prize winners in the FIGBY, or Finding in Garbage — Beauty, art contest organized by Fundamental Action To Conserve Energy of Fitchburg.

FACE planned the contest, which attracted entries from more than 100 students at six Central Massachusetts schools, to have art culled from trash to speak as a voice for a planet suffering from excessive waste.

FACE Executive Director Bill Stanwood said that while most people don't think about their garbage after it's taken away, the waste generated by our society "doesn't just go away" and leads to other environmental problems.

"This is an exercise that has people looking in their trash basket and seeing what's really there," he said. "What this does is raise the consciousness of people."

Stanwood, who, like other adults, was impressed by the creativity, intelligence and originality displayed by the youthful artists, said such skills are also a reason to take hope.

"That kind of entrepreneurial, creative thought is the thing which is going to pull us out of [illegible]," he said. "We're very encouraged by the young people have that."

Across the gallery room, a whooping crane with a feathered coat of snipped soda can pieces, a tin foil beak, a light bulb head and cardboard legs struggled while being strangled by a plastic six-pack ring.

Shelley Kenyon and Casey Tanner, both freshmen at Oakmont Regional High School in Ashburnham, said their sculpture of the endangered bird was meant to show the effect of environmental waste and neglect.

"I think a lot of people overlook the environment," Kenyon said. "Reusing is a way of showing it can be useful."

Other prize-winning artworks included an hourglass made from straws, water bottles and crumpled aluminum foil, and a landscape divided between clean and polluted sides.

> "This is an exercise that has people looking in their trash basket and seeing what's really there."
>
> BILL STANWOOD, FACE

"The theme was time was running out," said hourglass creator Chelsey Ferrigno, a freshman at Oakmont High. "Basically, we don't have a lot of time and need to reduce, reuse and recycle while we still can."

Sean Barnacoat, a fourth-grader at Townsend's Hawthorne Brook School, spoke [illegible] ably about his "trash" [illegible] street program while explaining his landscape.

"I'm trying to say this side shows that if we take care of the Earth, it will look like this, and if we don't, it will look yucky like this," he said of the side with pieces of simulated pollution.

The FIGBY contest follows similar efforts across the country and attracted primary sponsorship for cash prizes of $25, $50 and $125 from Veryfine, New England Business Systems and J.P. Routhier.

The contest was part of an environmental education program coordinated by FACE at schools in Ashby, Ashburnham, Pepperell, Townsend, Fitchburg and the Wachusett School District. Artworks will be displayed at the Fitchburg Art Museum before moving May 15 to Mount Wachusett Community College in Gardner.

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"The fate of the earth, quite simply, lies in the hands of man" Artist Marvin Mattelson

FIGBY

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A CONTEST FOR RECOLOGY SCHOOLS

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Category I: 2-D Two Dimensional Collage/Montage

1.dimensions can be up to 18" by 24"

2.only individual entries will be accepted in this category.

Category II: 3-D Three Dimensional Form

1.dimensions can be up to 3 feet square, 3'x3'x3'

2A.teams or classes

students are encouraged to work in groups of two or more.

2B.single students may enter the 3-D category

for five or more entries, a separate prize will be awarded

SCORE

USE SCALE 0-10 AND MULTIPLIER OF 5 FOR CREATIVITY, 3 FOR THEME, 2 FOR SKILL
EXAMPLE [1.] 5 Pts. X 5 =25 *PLUS* [2.] 6 Pts. X 3 =18 *PLUS* [3.] 8 Pts X 2 =16 TOTAL 59

School: Category I Independent Collage Grade _____

ENTRY NUMBER	A.CREATIVITY 0-10 Times 5 =	B. THEME 0-10 Times 3 =	C. SKILL 0-10 Times 2 =	TOTAL A + B + C =
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Certificate of Award

To

_____

In Recognition of Your

Enthusiastic Support of and Participation In

FIGBY

FINDING IN GARBAGE-BEAUTY

This Certificate is hereby Awarded to You

This FIRST day of MAY, 1993 by

Fundamental Action to Conserve Energy, Inc.

JOHN KEENEY

VICE PRESIDENT

RENE LAVOIE

PRESIDENT

"The fate of the earth, quite simply, lies in the hands of man" Artist
Marvin Mattelson

FIGBY

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PURPOSE: The art work will be the voice that speaks for planet Earth. The endangered animals and land need a voice to tell all people, "Reduce, Reuse, Recycle!" Express hopes for a healthy Earth through creative art made from "garbage".

SCORE

USE SCALE 0-10 AND MULTIPLIER OF 5 FOR CREATIVITY, 3 FOR THEME, 2 FOR SKILL
EXAMPLE [1.] 5 Pts. X 5 =25 *PLUS* [2.] 6 Pts. X 3 =18 *PLUS* [3.] 8 Pts X 2 =16 TOTAL 59

ASHBY

CATEGORY I
INDIVIDUAL COLLAGE

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

CATEGORY IIA TEAM
3X3X3 DIMENSIONAL

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

CATEGORY II B IND.
3X3X3 DIMENSION

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

WESTMINSTER

CATEGORY I
INDIVIDUAL COLLAGE

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

CATEGORY IIA TEAM
3X3X3 DIMENSIONAL

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

CATEGORY II B IND.
3X3X3 DIMENSIONAL

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

HAWTHORNE

CATEGORY I
INDIVIDUAL COLLAGE

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

CATEGORY IIA TEAM
3X3X3 DIMENSIONAL

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

CATEGORY II B IND.
3X3X3 DIMENSIONAL

1. CREATIVITY (50%)
_____

2. TRUE TO THEME (30%)
_____

3.TECHNICAL SKILL(20%)
_____

TOTAL_____

Teacher
Recology Study School
April 12, 1993

Dear Participating Teacher:

There are forms enclosed to assist in the scoring of the final phases of the first FIGBY, Finding In Garbage- Beauty, art contest. Your local school needs to select prize winners in the three Categories outlined in the designated grade levels. Some schools have two resident grade groups, and may have as many as six first prize winners.

Please locate those winning entries in an accessible school space. The winners will be judged in a grand prize contest which will be conducted during the week of April 19-24. Since that is school vacation week, special arrangements will be made to see the works. A form which will be used to judge the grand prizes is also enclosed. If you have any questions, or if you wish to nominate someone to the grand prize panel, please call me at 345-5385. If possible I will confirm final arrangements with each of you before school closes Friday the 16th.

Sincerely,

Bill Stanwood
Project Organizer

P.S. A form to document lesson time for the special Recology Lesson Plan devised for the school, or other environmental curriculum materials, is also enclosed. This form is intended to help simplify evidence with which to compare changes in the second survey results which will be completed in May.